SCIENCE

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THE DEPLORABLE CONTRAST BETWEEN INTRANATIONAL AND INTERNATIONAL ETHICS AND THE MISSION OF MEDICAL SCIENCE AND MEDICAL MEN[1]

THE chief aim of my remarks is to point out the unique position which medical sciences and medical men occupy in the horrible war which is going on between civilized nations. International morality may possibly derive some permanent benefit from a conscious knowledge of this position. However, in order to make my point clear, I shall introduce it by a discussion of some aspects of ethics.

Moral philosophy assumes for granted that ethical relations of civilized men are safely established; it concerns itself merely with the question regarding the nature of the origin of ethical precepts. In general, it may be admitted that the vast majority of civilized men indeed do not question the correctness of ethical demands. But writers on moral philosophy fail to distinguish between *intra*national and *inter*national ethics. Hence, we find frequently that international occurrences are discussed from the point of view of intranational principles; international occurrences are brought before the forum of a supreme court of the world for judgment, but the merits and demerits of the cases are argued from the point of view of ethics which obtain in intranational moral relations. But the truth is that there is an abyss between the two domains of morality.

Let us first look at the status of intranational morality. The ethical relations

[1] Address delivered at the annual dinner of Columbia University Biochemical Association, March 26, 1915.

among civilized fellow men, united by bonds of race, nation or country, are firmly established. Justice and duty are deeply rooted conceptions, the compelling force of which is spontaneously recognized by all normal members of the individual community; the small fraction of dissenters consists of defectives and criminals. Sympathy, kindness, altruism and self-sacrifice are not enforceable human virtues, but are nevertheless profoundly appreciated and admired by the individuals of all civilized nations. Honesty is an indispensable virtue. In parenthesis I may, however, say here that to my knowledge "honor" is not among the general precepts of ethics. It is an artifact; it is mostly an artificial virtue of a class which considers itself as being above the simple requirements of justice and duty. It is not an unusual occurrence that in the name of honor a man may slay with relative impunity a fellowman whose home life he has dishonored.

From Sokrates to our day students of moral philosophy offered various theories concerning the nature of the principles underlying the "science of conduct." I shall not discuss the merits of the theories of Hedonism or Utilitarianism, the Law of God or the Categorical Imperative; they do not concern us here. But I have to refer to one theory which was not received with great favor and which had only a short life of popular existence. In the latter half of the last century, under the powerful influence of Darwin's theory of natural selection in the domain of biology, a systematic attempt was made by some philosophers (Herbert Spencer and others) to look upon ethics as a purely biological phenomenon. Family ties of lower animals, it was thought, developed into the ethics of civilized nations. Whether on account of the feverish social and altruistic activities which have been going on in the last decade or two and for which a biologic theory of ethics could hardly have served as a sufficient stimulus; or whether on account of the general decadence in popular enthusiasm for the theory of natural selection in general, the fact is that the theory of biologic origin of ethics seems to have been generally abandoned in recent years. But whatever we may think philosophically regarding the nature of fundamental origin of ethics, we can practically not deny that *morality is subject to evolutionary influences;* it has undergone and is continually undergoing development. Morality manifests a continuous growth. The development of savage races into cultured, ethical nations is a matter of historical record. In fact, the progessive widening which conceptions like justice or duty are continually undergoing within the confines of a nation is practically a matter of direct observation during an individual's lifetime.

I shall dwell here especially on two elements which are operative in this process. The foremost factor in the evolutionary progress of intranational morals is to be found undoubtedly in the intellectual activities peculiar to man. The growth and development of the sciences, of arts, music, poetry, literature and religion, from their rudimentary phases into their present high states, elevated the specific human character and favored the widening and deepening of morality of any individual nation or rather the morality of the individuals of which these nations are composed. The human intellect may or may not be the primary cause of morality; but the unfolding of human intelligence and the growth of intellectual activities specifically human, are undoubtedly important elements in the growth and development of specific human morality. This connection between intelligence and morality is practically a matter of direct observation.

On this basis the further assumption is justified, that even the conscious primitive morality of primitive man did not make its appearance abruptly. It developed very slowly, parallel, to a certain degree, with the development of man in the animal stage into man with rudimentary intelligence.

I presume, then, that conscious morality did not begin abruptly, but developed very slowly, parallel with and assisted by the development and growth of human intelligence. However, important as the human intelligence may be, evidently it is not the only controlling factor of morality. We see animals acting towards their fellow creatures in a manner which, if seen in human beings, we would consider as highly ethical. We all know how animals care for their offspring. We see dogs licking the wounds of their fellow dogs—an act resembling a samaritan service. We see altruistic activities in the communities of the bees and the ants. We designate these animal activities as instincts and we have indeed no evidence that a conscious morality is at the bottom of these phenomena. We have, however, to keep in mind that the harmonious relations between animals are observed only among individuals of the same species or race, or the same drove or swarm, whether they are presided over by a bell-wether, a queen or any other single leader, or have a democratic form of government with several contending leaders. Animals belonging to different species, races or strains get frequently into ferocious fights as soon as they meet, or as soon as there is a collision of interests and instincts. There are therefore sufficient reasons for assuming that the purely animal, instinctive element is involved to a considerable degree in the moral relations between individuals of the same group of human beings which have some efficient bond in common.

Now let us look at the moral aspects which international relations present. The history of nations, civilized or uncivilized, consists chiefly of a tale of more or less ferocious wars interrupted by periods of peace. War is nothing but wholesale murder; but the men of one tribe or nation who are murdering men of another tribe or nation have no idea that they are committing crimes; on the contrary, the more civilized individuals among the fighters are honestly possessed by the conviction that they are performing a moral duty. It is true that in times of peace citizens of one country enjoy in another country most of the privileges enjoyed by the citizens of that country. This is guaranteed by treaties. There are also international laws which even presume to prescribe the mode of warfare among the signatory powers. In time of peace a sincere friendly intercourse frequently prevails between the individuals of various nations. There are numerous international reunions for the purpose of furthering human knowledge and general human interests in all lines of human endeavor. All these facts may give us the right to speak of international morality. Nevertheless, even peace, especially peace in modern times and among civilized people, is practically nothing more than a *truce* during which nations are feverishly active in preparing for the next war, preparing to slaughter their apparent friends of to-day and to lead or to drive their own men to be slaughtered. During peace the leaders of nations are engaged in their military quarters or in their chancelleries in spying upon and intriguing against the nations with whom they exchange international amenities.

In international dealings cunning and deceit are essential factors in success; it is diplomacy. Honesty has hardly a place in these dealings. Only honor is the big

word which is loudly used by those who speak for nations as units, that sham virtue in the name of which crimes are committed by the privileged classes within each nation and in the name of which hundreds of thousands of honest and innocent citizens of various nations are murdered or crippled for life in the groundless and senseless strife of nations, brought about by the ambitions of unprincipled leaders. Furthermore, international relations in time of peace, which have an ethical appearance, are held together by flimsy ties. International peace conferences, international law, and peace treaties are merely scraps of paper which are torn to shreds at first sight of a bone of contention between nations.

In a previous section I insisted, and I believe rightly, that intellectual growth and activity are most important factors in the development and growth of intranational morals. What is the value and influence of intellectual growth and activity in international morals? Highly intellectual, civilized nations fight one another with a rage, a ferocity and with an intent to kill as probably did their animal ancestors of different strains or races, hundreds of thousands of years ago. But different species of another type of animals, let us say dogs and cats, are probably fighting to-day as their ancestors fought thousands of years ago, that is, tooth and nail, the only weapons at their disposal; their physical agility, their promptly acting reflexes, the finer developed senses and their remarkable instincts did not help them in developing new weapons or new ways of fighting; they had no human intellect. But the human race? We need not go back thousands of years. It suffices to compare warfares separated only by a hundred years. I need not enter upon a comparison of the rage, brutality and barbarity with which the wars are conducted; in this regard the present war is surely not behind its predecessors, and none of the cultured belligerent nations are ahead of or behind the others. Perhaps atrocities are at present not so much a question of barbarity as of success and efficiency—the idols of all walks of modern life. But as to destructiveness of human life, that cardinal aim in the war of nations, the progress made in this comparatively short span of human history is immense; it reads like a fairy tale. From high in the air a human bird directs you to turn a micrometer screw one millimeter or two and a huge shell annihilates hundreds or thousands of your enemy. A small group of human fishes bubble up in the vicinity of a huge leviathan, a dreadnought, and in less than ten minutes hundreds of men and millions of dollars are forever at the bottom of the sea. In a stretch of hundreds of miles, hundreds of thousands of soldiers are moved rapidly without a hitch from one place to another where they are needed most. The success is wonderful. In barely eight months millions of people were killed or crippled, perhaps as many more were made homeless and driven into starvation and billions of dollars borrowed and wasted. And that astounding result was not accomplished as in olden times, merely by extraordinary physical force or endurance or by that virtue in which wild beasts greatly excel men, the virtue of physical courage; it was accomplished by specific human ingenuity. Mathematics, physics, chemistry and other theoretical and practical sciences have made these awful results possible. In fact, practically every kind of intellectual activity took and takes a profound part in the bitter struggle which now goes on among highly civilized nations. Historians, philosophers, literary men and others are busy contrib-

uting offensive and venomous literature about their fellow men of nations with whom their country is at war, whose friends they were and whose honors they enjoyed. Poets sing the song of profound hatred and musicians write the melody to it, or compose war marches and songs. Religion offers an extraordinarily sad spectacle. Nations having the same religion and believing in the same God, pray to Him that He may help them destroy their enemy. Think of the robber and murderer who on his most godless errand prays to God for aid and guidance!

But here I must call your attention to a paradoxical but remarkable fact. Beastly as international morality is, when nations are at war, war nevertheless unquestionably elevates the *intra*national morality. The majority of citizens in every country are not idealists; in time of peace they comply with the laws of their country and fulfill their simple duties, not more and not less. But when their country is at war, a new spirit comes over them; they become altruists, they are ready to bring sacrifices, to lose their life or to become cripples for life. Whether a country is right or wrong with regard to the merits of a particular war in the eyes of an outsider, a neutral, this has no bearing upon the moral status of the man inside his country. That status is unquestionably elevated during war, and even after the war his relations to his countrymen remain on a higher moral plane. But this applies to civilized countries only, and of these only to such countries whose civilized citizens fight its battles.

Now let me recapitulate briefly. Human morality, whatever the nature of its origin may be, was and is subject to evolutionary influences. It began in the presavage state of men. Its development has been and is a very slow process. In its present state we must sharply distinguish between intranational and international ethics; there is an abyss between them. Intranational morals attained a high state. Intellectual activities of all kinds were and are most important factors in its growth. The morality in international relations, on the other hand, is generally low, and is frightfully bad when these relations are interrupted by war. War is an animal method of settling differences between two contending vicious species, and human intellectual activities greatly intensified the deadliness of the procedure. The efforts to create international laws for the purpose of restraining the ferocity of international struggles proved of little avail. We have cultured, civilized Germans, Frenchmen, Englishmen, and so on, but the world is not yet inhabited by cultured civilized men.

Apparently biological processes are operative in these horrible differences between the intranational and international states of morality. Intellectual activity is capable of efficiently assisting in the development of morality among individuals which are allied by some organic and social bonds; thus little or no resistance is offered to the beneficent intellectual influence. But individuals of different strains, with natural divergences and antagonisms, sustained by differences in education, customs, forms of law, etc., offer great resistance to the unifying influences of intellectual activity.

Accordingly, biological traits common to all animals, while some of them may exert a favorable influence upon the evolution, rate of growth and the direction of human morality, are surely not the main factors of its creation and development. On the contrary, in interracial and international relations many biological traits are profoundly inimical to a development

of proper moral ideals. Struggle for existence, uncontrolled physical strength and dexterity, love of fight, hate, rage, bravery, etc., are traits which the human race has in common with wild beasts, and an uncontrolled cultivation of these traits may often prove disastrous to all human morality. On the other hand, intelligence and intellectual activities are traits which distinguish man from beast. Their intense cultivation by civilized men has been the main cause of the high state of morality which prevails and is visibly progressing within the confines of civilized countries—the *intra*national ethics.

But now let us turn again to international ethics. We have seen that there is an abyss between international and intranational morality. We have seen further that war between civilized countries brings in modern times incomparably more frightful results than in previous ages, which is undoubtedly due to the astounding discoveries and inventions brought to light by the intense intellectual activities in the various cultured countries. Are discoveries and inventions, are even apparently sound intellectual activities, dangerous to international morality? Is this morality rather regressive instead of being progressive? And what can we do to make it progressive or to accelerate the imperceptible progress? The last question is the more important one, since it presents a practical and not merely an academic problem. In the following I intend to discuss some factors which may contribute in some modest way to its solution. I am fully aware, as all of you are, of the immensity of the problem, and I am aware, more than you, of the microscopical dimensions, metaphorically speaking, of your guest of the evening. But I shall act now as I always acted, upon the principle that it is neither good nor wise to possess less courage or more modesty than that drop of water which innocently and cheerfully undertakes to drill a hole in a rock.

As one who swore allegiance to the medical tribe, I shall begin by saying that the case of international morals is very bad indeed, but it is by no means hopeless; that only hopeful men are capable of attaining desirable results; that a remedy which promises to bring some help, be it ever so small, is not to be despised, and that a sum of such remedies may save even a bad case.

It seems to me quite probable that interracial and international morals are also subject to evolutionary influences and are undergoing a developmental process; but the progress is extremely slow because it has to struggle too much against the beastly nature of man. Even the development of international morality is a slow process; it must have taken many thousands of years before it reached its present stage. The present condition of international ethics would perhaps appear to us even quite high, if we had the means to compare it with its status of hundreds of thousands of years ago. This recognition, namely, that interracial and international morals are undergoing a progressive development, but that their progress is necessarily very slow, seems to me to be a very useful one. In the first place, because it encourages us to try to accelerate this progress, be the rate of the possible increase in the acceleration ever so small and be the means at our disposal for accomplishing it ever so meager. In the second place, it suggests to us to avoid looking for means of acceleration which are far out of proportion with the rate of the evolutionary progress; it is bound to fail and even to bring a temporary reaction, as history taught us over and over again.

I do not consider it as my province to try to discuss here all sorts of means which possibly may serve to increase progress in international morality. My chief purpose is, as stated at the beginning, to bring forward the value of medical sciences and medical men as efficient factors in furthering the progress of international morality. However, before coming to it, I wish to call attention briefly to a point or two to which reference has been made before. I believe, in the first place, that it is of prime educational importance to point impressively to the fact that there is a gulf between national morality, on the one hand, and interracial and international morality, on the other hand. A confusion between the two sets of ethics may harm the former and retard the possible progress of the latter. Citizens in neutral countries at all times, and citizens of all countries in times of peace, should know, should feel it deeply in their hearts, that war has not the slightest feature of morality, that it is simply a mode of settling differences between two or more strains of the human race in the fashion of wild beasts, increased in deadliness and ugliness by the activities of human intelligence. Here is an incontestable fact which gives pain and distress to the moral man; humanity, as a whole, shows that its moral conduct is not above that of vicious animals of various species. The discussion of the question as to who began the war and who prevents its conclusion is far from the mark; it is purely academic and is borrowed from the point of view of intranational morals. Justice and law had little to do with the beginning of the war and will have very little to say with its settlement. War is carried on by brute force and is settled by it with the aid of exhaustion and starvation. The many circumstances which lead to the numerous wars are mere incidents, but not the real cause of them. There is only one cause for all the wars and that is the possession by human beings of ferocious qualities peculiar to wild beasts, often entirely unrestrained and sometimes even directly cultivated to a higher degree.

In teaching intranational morality it ought to be made clear that physical strength, courage, dexterity and efficiency, useful and desirable as they are for the success in the life of the individuals and the nation they compose, are not moral principles. On the contrary, they may greatly magnify the evil results when used for unethical principles. Bravery and efficiency, which are most highly valued qualities in war, are qualities which are most destructive to your so-called enemy of to-day and perhaps your friend of yesterday and, moreover, perhaps of your friend of a day after to-morrow.

I now come to the chief point I wish to discuss. Short as the discussion will be, it is nevertheless the chief object of my entire discourse. I have stated above that the striking feature of this war, the great destructiveness of human life, owes its success to the employment of scientific results in carrying on the war. All sciences which may contain some practical element are contributing in some way or another to the wholesale destruction of human life. And not only the scientific results, but the scientists themselves are active at the front in laboratories improvised in large automobiles to search for new inventions and discoveries which may be of some immediate practical use or to predict the nature of the weather to be expected at different points, etc. And those who can not assist in such a direct way try to contribute to the spirit of war by spreading enthusiasm, by abusing the enemy, and by implanting hatred against it.

But there is one most inspiring exception

to this sorrowful rule. It is the utilization of the medical sciences and the behavior of medical men in the war. The results of medical investigations of the last few decades and the activities of medical men are of immense practical importance to modern warfare. In some of the former wars perhaps as many soldiers were wiped out in consequence of disease as were killed by the bullet or bayonet. The combined modern studies in pathology, bacteriology, hygiene, surgery, medicine, pharmacology, preparation of antiseptics, etc., have immensely reduced the ravages of war as far as sickness and injuries are concerned. Medical sciences and medical men are part and parcel of wars. But what is their ethical status with reference to strife of nations in comparison with other sciences, with other men of science, men of culture and education? Here is the answer.

None of the numerous important discoveries made in the medical sciences was ever used for the destruction of life or harming the enemy in modern civilized warfare.

Any discovery or invention made in the sciences or the practise of medicine, made in one of the warring countries, is freely given to the medical fraternity of a belligerent country—unless it involves a business relation over which medical men have no power. It is illuminating to read a review in an English medical journal of medical reports made at a German medical meeting held on a battlefield.

On the battlefield, on the firing line, perhaps in the midst of a hail of bullets and fragments of shrapnel, *physicians and surgeons, some of them volunteers, pick up wounded soldiers without regard to nationality, and treat friend and foe alike. It is practically of no moment to the sick and wounded soldier to which of the hospitals of the civilized belligerent nations he will be taken for treatment.* The physician, as a physician, knows no difference between races and nations, between friend and foe.

And withal physicians in every one of the warring countries are as good patriots, and are as ready to sacrifice their lives in their country's struggle, as any other patriotic citizen of his beloved country, with the only difference that he, *the physician, is merely ready to die, or to be crippled for life, in the service for his country, but he is not engaged in killing or harming any one belonging to another nation or country.*

There might be a few exceptions—it would be miraculous indeed if there would be none; any large group has its exceptions. But such few exceptions can not be held up against this wonderful picture which medical men present in war. And wonderful indeed this picture is. We have seen how low international morals are at all times; we see how infamously bad it is at the time of war and especially at the present ferocious war of cultured nations. And in the midst of this inferno we perceive a group of sciences which are in intimate contact with life and with war, and which nevertheless never contribute to the degradation of interracial and international morality. We perceive, furthermore, in every belligerent nation among the combatants a group of patriotic men, brave and ready for every self-sacrifice, who do nothing but render help to those who need it, who render it as members of their particular country, but render it to foe and friend alike. Here are representatives of humanity, as a whole, here is a most encouraging example of an elevated international morality.

This wonderful fact is not my discovery; it is a fact well established, and well

known to everybody, at least ought to be known by everybody. But *the calling of this fact to full consciousness of the members of our profession may render a great service to the progress of international morality.*

In the dawn of history, the medical man was also the treasurer of philosophy and morals. In the middle ages when knowledge became specialized, medical men more and more devoted their activity exclusively to medical practise. On account of the inefficiency of medicine at that time, medicine lost its prestige. However, in the recent decades medicine became a science and one marvelous discovery follows another, and the efficiency of medical practise increases rapidly. Medicine makes accessible to man uninhabitable parts of the world. It prevents disease, and with increased efficiency it learns to cure it. Medical sciences and medical men rose in the estimate of discriminating civilized mankind. *Could they (medical sciences and medical men) not become again bearers of the flag of morals, especially of international morals?* In the furious struggle which is going on at present amongst civilized nations international morals lost its friends; religion, sciences and the brotherhood of mankind proclaimed by the followers of socialism failed it; medicine alone did not desert it. In times of peace and for the purpose of furthering useful knowledge medical sciences and medical practises are working in separate groups, according to their specific aims. But all medical men of various shades and groupings ought to unite for this one high aim, *ought to establish a Medical Brotherhood for the Purpose of Upholding and Accelerating the Progress of International Morality.*

Every one of the scientific and practical men in medicine in our large country ought to join with enthusiasm such a missionary enterprise. The initiative ought to be taken by our large neutral country, but we may appeal to our neutral brethren in other neutral countries to join our crusade. However, we must not approach our medical confreres in the belligerent nations as long as the war lasts, lest it may be interpreted as an attempt to weaken their patriotism and their enthusiasm for the cause of the particular countries of which they are an integral part.

S. J. MELTZER

ROCKEFELLER INSTITUTE FOR MEDICAL RESEARCH

CYRUS FOGG BRACKETT

BY the death of Professor Cyrus Fogg Brackett, which occurred on January 29, another link connecting the present with the past in the history of physics in this country was broken. Professor Brackett belonged to that group of physicists whose influence is now felt through their pupils in most of our universities. In the early days of his service at Princeton he was associated with Joseph Henry, who was a trustee of the college, and who took an active interest in the development of the department of physics under Professor Brackett's direction. His early studies came before the French influences had been superseded by the German, and his thinking always showed traces of that early training.

Professor Brackett, after graduation at Bowdoin College in 1859, studied medicine at the Harvard Medical School, and was graduated as Doctor of Medicine in 1863. He then returned to Bowdoin as a member of the faculty, and soon became professor of chemistry and physics. In 1873, on the advice of Professor Henry, he was called to Princeton as professor of physics. His coming to Princeton coincided with the foundation of the John Green School of

Science, and with a greatly increased interest in all scientific studies. He became at once the trusted adviser of the board of trustees in their endeavors to increase and improve the instruction in scientific subjects, and he was influential with the faculty in all matters connected with the development of the curriculum.

The physical laboratory as he found it had no equipment for research, and but little for demonstration. He felt it was his duty to devote himself to the improvement of the equipment, and to the organization of courses of lectures and laboratory instruction. As new apparatus came in he would put it together and test it, and when new apparatus was wanted which could be better made than purchased, he would construct it with his own hands. He was very skillful in all mechanical work, and much of the apparatus which he made is still in use.

At the same time he gave himself with entire devotion to his labors as a teacher. He thoroughly believed that physics should form an essential part of every student's course of study, and realized that if this were the case the course in physics should not be confined to the dry details of the subject, but should rather present the philosophy of nature. Owing to the breadth of his education, and to his unlimited interest in all scientific and philosophical questions, he was able to illuminate his subject with illustrations drawn from other sciences, and from the practical applications of science in the arts. His courses of lectures were not only instructive, but inspiring, and many of his students remember him with affection and respect as the most stimulating influence in their intellectual life.

Professor Brackett's interests were strongly excited by the development of electrical science, and of its applications to the comfort and convenience of life. He was acquainted with many of the great inventors by whom those applications have been made, and he became connected with some of their principal achievements as an expert adviser. He was occupied for several years as an expert, both in the laboratory and in the courts, with the questions arising in the contest concerning the invention of the telephone. He was thus led to give instruction in the engineering side of electrical science, and ultimately in 1889 to undertake the development of a school of electrical engineering. The course in this school, as he planned it, is designed for graduates, or for others already properly qualified by a sufficient knowledge of mathematics, physics and chemistry. One of its principal features is the emphasis laid upon the advanced study of general electrical science. His aim was to give his students a thorough general knowledge of their science, so that after a short experience in the practise of their profession they might qualify for positions in which scientific knowledge is particularly needed. Although, as he appreciated would be the case, the membership of this school has never been large, many of those who have gone out from it have justified the plan on which it was organized by rapidly attaining important places in the profession of electrical engineering.

Professor Brackett was for many years a member of the American Association for the Advancement of Science, and in 1886 was vice-president of section B. He was also a member of the American Philosophical Society. His knowledge of medicine and his general interest in the public welfare led to his appointment as a member of the State Board of Health of New Jersey. He served as president of this board for ten years. He was also for many years a member of the sanitary committee of

Princeton University, and was its responsible member in charge of the infirmary.

In 1908 he insisted on retiring from active service and was made professor emeritus. He at once turned his attention to research, for which he was so well fitted, and from which his devotion to professorial duties as a teacher had for so many years excluded him. He employed his technical skill in making optical preparations, and at last became interested in the construction of a ruling engine for the construction of diffraction gratings, of the sort known as echelette gratings. He devised a new method for the mechanical grinding of the screw, by which most of the hand labor that was needed in the methods previously used was avoided, and before his death he had the satisfaction of seeing the engine which he constructed producing gratings of satisfactory quality. With very little additional labor it will be fitted to do the work for which it was designed.

Professor Brackett was gifted with a most winning personality. He made friends of his colleagues and his pupils. The gift of the Palmer Physical Laboratory by Mr. S. S. Palmer, and its endowment by Mr. D. B. Jones and Mr. T. B. Jones, are monuments of the affectionate regard which he inspired in some of those who knew him. He was a wide reader, and an ingenious speculator on physical questions, and was always ready to contribute of his knowledge to those who came to him for information and advice. He will be remembered by all who came within the range of his influence as an inspiring teacher, an affectionate friend and a good man.

W. F. MAGIE

GEOGRAPHICAL MEETING IN NEW YORK

THE second joint meeting of the American Geographical Society and the Association of American Geographers will be held in New York, Friday and Saturday, April 9 and 10, 1915. With the exception of Friday evening, the sessions will be held at the society's building, Broadway at 156th Street. President Dodge of the association will preside at the sessions. The joint meeting will be called to order on Friday morning by Mr. John Greenough, vice-president and chairman of the council, American Geographical Society. The Park Avenue Hotel at the corner of 33d Street and Park Avenue, will be headquarters for association members. The American Geographical Society has very generously asked all association members to be their guests at the hotel during the meeting, from Thursday afternoon, April 8, to Saturday afternoon, April 10. The arrangements make it desirable to dine together at hours to be announced at the session on Friday. It is hoped that as many members as possible will arrive on Thursday in time for dinner and the social gathering in the secretary's room at the hotel during the evening. The American Geographical Society has invited all members of the association to luncheon on both Friday and Saturday noon at a restaurant close to the society's building. Mr. George A. Plimpton has invited the members of the association, their wives, and all workers in geography in attendance at the meeting to meet at his home on Friday evening. Mr. Plimpton will speak informally on Early American Geography, and exhibit his complete and interesting library of early American texts in geography.

The scientific program is as follows:

FRIDAY MORNING SESSION (FROM ELEVEN O'CLOCK TO TWELVE-THIRTY)

"The Coast of New Caledonia," by W. M. Davis.

"Geography of the Navajo Country," by H. E. Gregory.

FRIDAY AFTERNOON SESSION (FROM TWO O'CLOCK TO FIVE)

"Utah, the Oasis at the Foot of the Wasatch," by Mark Jefferson.

"The Geographic Factor in Agricultural Industries," by C. S. Scofield.

"Origin of Some Desert Basins," by N. H. Darton.

"The Natural History of Ancient Vinland, and its Geographic Significance," by M. L. Fernald.

FRIDAY EVENING SESSION (AT 8:30, 61 PARK AVE.)

"Early American Geography," by George A. Plimpton.

SATURDAY MORNING SESSION (FROM TEN O'CLOCK TO TWELVE-THIRTY)

"Argentina and the Argentines," by Bailey Willis.

"Winter Weather as a Factor in the Great War," by R. DeC. Ward.

"The Muir Glacier in 1911 and 1913," by Lawrence Martin.

PACIFIC ASSOCIATION OF SCIENTIFIC SOCIETIES

At the Seattle meeting of the Pacific Association in May, 1914, the new constitution for a Western Division of the American Association for the Advancement of Science was accepted and recommended to the constituent societies for their adoption. It was determined that a two thirds vote would be necessary for adoption; that if this vote was secured before the meeting of the American Association at San Francisco in August, 1915, the work of the Pacific Association would be given over to the Western Division at the end of the August meeting, provided the Western Division was organized and ready at that time to continue the work of the Pacific Association. On March 20, 1915, the required two thirds vote was secured, and the Pacific Association is now ready as soon as the constitution is signed by the officers of the voting constituent societies to turn over the work to the new Division at the end of the August meeting of the American Association. The following societies adopted the new constitution in the following order: Biological Society of the Pacific Coast, Pacific Coast Paleontological Society, The Cordilleran Section of the Geological Society of America, The Seismological Society of America, Astronomical Society of the Pacific, The Technical Society of the Pacific Coast, The Cooper Ornithological Club, California Academy of Sciences, Puget Sound Section of the American Chemical Society, The Pacific Slope Association of Economic Entomologists, San Francisco Society of the Archeological Institute of America, and the San Francisco Section of the American Mathematical Society—twelve societies in all. The following societies rejected the constitution: The Philological Society of the Pacific Coast, and the San Francisco Section of the American Chemical Society. The Geographical Society of the Pacific did not reply. The Pacific Coast Branch of the American Historical Association will decide the question late in 1915.

Dr. Campbell, president of the American Association, has already appointed a committee to effect the organization of the division, and it will be ready in August to receive the work and the archives of the Pacific Association which will in this manner terminate a five years of active work.

J. N. Burman,
Secretary of the Pacific Association

Seattle,
March 30, 1915

SCIENTIFIC NOTES AND NEWS

Dr. Ira Remsen, president emeritus of Johns Hopkins University, will deliver the principal address at the formal opening of the new chemistry building of the University of Minnesota, on May 24.

At the recent commemoration day exercises at the Johns Hopkins University there was presented to the university by a committee of which Dr. William S. Halsted, professor of surgery, was chairman, a portrait in oil by Mr. Seyffert, of Philadelphia, of Dr. Franklin P. Mall, professor of anatomy in the university. Dr. Lewellys L. Barker, professor of medicine, made the presentation address.

Professor Charles S. Wilson, of the Cornell School of Agriculture, has been nominated by Governor Whitman as New York state commissioner of agriculture.

Officers of the Royal Astronomical Society have been elected as follows: *President,* R. A.

Sampson, astronomer royal for Scotland; *Vice-presidents,* J. W. L. Glaisher, Esq., Colonel E. H. Hills, W. H. Maw, Esq., H. H. Turner, Savilian professor of astronomy, Oxford; *Treasurer,* E. B. Knobel, Esq.; *Secretaries* A. S. Eddington, Plumian professor of astronomy, Cambridge, Alfred Fowler, Esq.; *Foreign Secretary,* Arthur Schuster, Esq.

NINE members of the American Red Cross Sanitary Commission, on their way to Servia to fight the ravages of typhus and other contagious diseases in that country, sailed on April 3 on the steamship *Duc D'Aosta,* for Naples. They were: Dr. Thomas W. Jackson, chief sanitary inspector; Dr. Hans Zinsser, bacteriologist; Dr. Andrew W. Sellards, Dr. George C. Shattuck, Dr. F. B. Grinnell, Dr. B. W. Caldwell, W. S. Standifer, Luis de la Pena and Hobart D. Brink. Dr. Richard P. Strong, the director of the commission, will meet them at Salonika. The expenses are being paid jointly by the Rockefeller Commission and the Red Cross.

ON the retirement of Mr. Otto H. Tittmann from the superintendency of the United States Coast Survey, recently announced from Washington, Dr. Henry S. Pritchett, president of the Carnegie Foundation, writes: "He entered the Coast Survey forty-eight years ago, and received his scientific training, as was the custom in that day, in the survey itself. Passing through all the divisions of scientific work, including hydrography, geodesy, terrestrial magnetism and tidal observation and prediction, Mr. Tittmann reached the highest scientific position in the survey and became in 1898 assistant superintendent, and in 1900 superintendent of the Coast and Geodetic Survey. His administration of this great post has been admirable, both from the scientific and the administrative point of view. His contributions to the determination of the figure of the earth, to the fixation of the boundary line between Canada and the United States, and his part in international geodesy have done credit to the country. With all his distinguished ability and service, he has united a modesty as fine as it is rare. It is a fortunate country which has such public servants."

DR. ARTHUR W. GOODSPEED, professor of physics in the University of Pennsylvania, has returned from Marburg, Germany, where he intended to pursue research work.

PROFESSOR LYNDS JONES, of Oberlin College, is planning to take a party of twelve students with an assistant to the coast of Washington, leaving Chicago June 21. Seven weeks will be spent studying the ecology of the region. From Neah Bay to Moclips the party will have as guides Guilliute Indians, making use of a gasoline launch and canoes along the coast. Special scientific investigation will be made of Coelentera, Echinodermata and Mollusca which abound between the tides. In addition, particular attention will be given to the kelp beds, the trees and bushes of the coast and the land animals of the islands. Members of the expedition will later visit the exposition at San Francisco.

THE address to the graduating class of the Michigan College of Mines is to be given this year by Professor James F. Kemp, of Columbia University, on April 16.

DR. JOHN F. ANDERSON, director of the hygienic laboratory, U. S. Public Health Service, addressed the Minnesota Pathological Society, on March 30, at the Institute of Anatomy. His subject was: "The Present Status of Our Knowledge of the Etiology and Distribution of Typhus Fever."

DR. EDITH J. CLAYPOLE, research associate in pathology in the University of California, died on March 27, in Berkeley, California. Dr. Claypole was well known as a teacher and investigator in biology and during recent years for her work on the differentiation of streptothrix infections in human beings, and on immunization against typhoid fever.

J. FOSTER CROWELL, known as an expert in railroad construction and hydraulic engineering, author of works on engineering subjects, including "Training a Tropic Torrent," "How Holland Was Made" and "Modern Wharves and Harbor Facilities," died in New York City, on March 29, aged sixty-seven years.

MISS MARY E. GARRETT died on April 3, in the sixty-second year of her age. Miss Garrett

took an active interest in education and gave large sums to the Johns Hopkins Medical School, Bryn Mawr College and the Bryn Mawr School for Girls in Baltimore.

Sir John Cameron Lamb, long connected with the British post office and chairman of many departmental committees, the author of works dealing with improvements in the use of the cable and the wireless telegraph and the construction of lifeboats, died on March 30, at the age of sixty-nine years.

The Royal Astronomical Society has by a vote of 59 to 3 passed a resolution as follows:

> That this meeting approves of the admission of women as fellows and associates of the society, and requests the council to take all necessary steps to render their election possible.

The twenty-fourth session of the Marine Biological Laboratory of Leland Stanford Junior University at Pacific Grove, California, will begin on Monday, May 24, 1915. The regular course of instruction will continue six weeks, closing July 3. Investigators and students working without instruction may make arrangements to continue their work through the summer. The laboratory will be under the supervision of Professor G. C. Price, instructor in charge.

Professor J. Paul Goode, of the University of Chicago, has just issued the map of Africa in two forms, physical and political, and the fourth pair in the series of wall maps for colleges and schools upon which he has been at work for some years. The maps are 46 x 66 inches in size, the physical map printed in twelve colors, the political map in nine colors. These maps are entirely new, from original sources, and represent an earnest effort to achieve the highest quality of work in the map makers art.

The American Ornithologists' Union will meet in San Francisco, May 18–20. Eastern members will leave New York on May 6, reaching San Francisco on the evening of May 15. Two days, May 10–11, will be spent at the Grand Cañon, and two days and a half at Los Angeles. The sessions will be held at The Inside Inn, within the Exposition Grounds, with the annual dinner on the evening of May 18. Friday, May 21, will be devoted to a trip to the Farallon Islands, on the U. S. Fisheries steamer *Albatross*, and other trips will be arranged in accordance with the number of visitors and their inclinations.

The Southwestern Anthropological Society was organized on March 27, at Santa Fe. The report of the organization committee was unanimously adopted and Dr. Livingston Farrand, president of the University of Colorado and formerly professor of anthropology at Columbia University, was elected president. Dr. F. E. Mera was elected vice-president; Paul Radin, secretary, and Judge R. H. Hanna, treasurer. The members of the committee of research elected were Professor P. E. Goddard and Mr. Niels Nelson, of the American Museum of Natural History, New York City; Professor Franz Boas, of Columbia University; Professor A. L. Kroeber, of the University of California; Professor A. Tozzer, of Harvard University, and Mrs. Stevenson, of the Bureau of American Ethnology. Drs. Farrand and Radin are ex-officio members of this committee.

The magnetic survey vessel *Carnegie* left Brooklyn on March 6, bound on a two years' cruise, *via* the Panama Canal. The region of work will be chiefly in the Pacific Ocean and in the south Atlantic and south Indian oceans. A complete circuit of the earth between the parallels of 60°–65° south is to be attempted, November, 1915–March, 1916, starting out from Port Lyttleton, New Zealand, as a base. The *Carnegie* is commanded on this cruise by Mr. J. P. Ault, who will be assisted in the scientific work by Dr. H. M. W. Edwards (second in command) and by observers Johnston, Luke and Sawyer. Dr. Mauchly accompanies the vessel as far as Panama in order to assist in the inauguration of the work in atmospheric electricity which, with the aid of new appliances, is to be made a special feature on this cruise.

The appeal for subscriptions to the Sir William White Memorial Fund has resulted, we learn from *Nature*, in a sum of $15,000, contributed by 455 subscribers. The committee of the fund has decided that the most

suitable form which the memorial could take would be the establishment of a research scholarship in naval architecture to be named after Sir William White; and it has been arranged to hand over to the council of the Institution of Naval Architects the greater part of the funds subscribed so that a sum of at least £100 a year shall be available for the scholarship, which will be administered by the council of that institution. In addition, a medallion portrait will be placed in the new building of the Institution of Civil Engineers, and, finally, at the suggestion of Lady White, a donation of one hundred guineas has been made to the Westminster Hospital, where Sir William White passed away.

THE Washington Academy of Sciences is giving a series of lectures in the auditorium of the New National Museum, to which the public is invited. All these lectures are illustrated by lantern slides. The program is as follows:

March 18—"The Volcano Kilauea in Action," by Arthur L. Day.
March 25—"Nematodes, their Relations to Mankind and to Agriculture," by N. A. Cobb.
April 1—"High Explosives and their Effects," by Charles E. Munroe.
April 8—"Insects and their Relation to Disease," by W. D. Hunter.
April 15—"The Earth," by R. S. Woodward.

SOME years ago the buildings of the aquarium at Rothesay, which was for a time one of the well-known "sights" of the Clyde, were taken over by the Marquis of Bute. The buildings have through his generosity provided a local habitation for the Buteshire Natural History Society, of which Dr. J. N. Marshall is president, while they have also served to house a valuable and developing museum collection of the local fauna and flora. Lord Bute has now installed a small laboratory for biological research and provided the most necessary equipment, including a motor boat. Mr. L. P. W. Renouf, of Trinity College, Cambridge, has been placed in charge and, as he is desirous of making the laboratory a thoroughly convenient center for research work on the wonderfully rich marine fauna and flora of the Clyde estuary, he will be grateful for the gift of books and pamphlets bearing upon marine zoology and botany.

THE sundry civil act as passed by the last session of congress contained appropriations of $1,355,520 for the United States Geological Survey. Most of the appropriations for the Survey are included in this great government supply bill, but in addition to the above-stated amount $40,000 was appropriated in the legislative bill for rents, so that the total amount appropriated is $1,395,520. The principal items in the appropriations for the Geological Survey for the fiscal year ending June 30, 1916, are as follows:

Topographic surveys	$350,000
Geologic surveys	350,000
Mineral resources of Alaska	100,000
Mineral resources of the United States	75,000
Chemical and physical researches	40,000
Geologic maps of the United States	110,000
Gaging streams, etc.	150,000
Surveying national forests	75,000

The bill also appropriates $175,000 for printing and binding survey reports, to be expended by the public printer, and $1,500,000 for the new Interior Department building, which is to accommodate the office of the Secretary of the Interior, the Geological Survey, the Reclamation Service, the Land Office, the Indian Office and the Bureau of Mines, all bureaus of the Interior Department whose work is closely related to that of the survey and among all of which there is more or less constant cooperation. The total cost of the new building has been fixed at $2,596,000.

THE test and certification of watches, chronometers and other timepieces has been carried on for many years at the Kew Observatory in England, at the Besançon Observatory in France and at the observatories of Geneva and Neuchâtel in Switzerland, but no such tests have been made for the public in this country, except for a few years at Yale University many years ago. This line of work is now started at the Bureau of Standards, and Circular No. 51, entitled "Measurement

of Time and Tests of Timepieces," has just been issued, giving the regulations under which the tests will be made, the methods employed, together with sections on the use and care of watches, and on standard time and the sources of reliable time standards with which one may make frequent comparisons of his watch. This first edition of the circular announces the regulations for the test and certification of watches only; the test of other timepieces will be taken up later. For the purposes of test watches are divided into two classes, designated as A and B, adapted to watches adjusted for five positions and three positions respectively. The former test lasts 54 days, the latter 40 days. Both tests include a test of the temperature compensation of the watch, at temperatures of 5°, 20° and 35°. In the Class A test is also included an examination of the isochronism adjustment of the watch. Four tests a year are carried out, beginning on the second Tuesday in January, April, August and October respectively. The daily rates of the watches under the various conditions are determined within about 0.1 second. If the performance of a watch is within certain tolerances set for the different conditions, a certificate is granted showing the results of the test. If a watch fails to meet the requirements, a report is rendered showing wherein it fell short of the tolerances and giving its actual performance in the trial. Watches may be submitted by manufacturers or jobbers of watches, by retail dealers, or by individual owners of the watches, a fee being charged which is estimated to cover the actual cost of the test. It is expected that the tests will be especially valuable in cases where watches are to be used for scientific purposes or exploration, and also to purchasers of high-grade watches in giving them assurance that the watch is reasonably adjusted and in good condition at the time of the test. Copies of the circular and also of the application blank which must be filled out by those submitting a watch for test may be obtained upon request directed to the Bureau of Standards, Washington, D. C.

We learn from *Nature* that the movement started last year for the establishment of a Radium Institution in Manchester met with a generous response from the public. Thanks to the assistance of public men and the press, the committee that was appointed to carry out the scheme was able to collect a sum of about £30,000. The radium department was established at the Royal Infirmary, and began work on January 1 in a number of rooms that had been equipped at a cost of £1,000, and started with about 800 milligrams of radium metal. The contract for the radium, which cost about £21,000, was given to an American firm, and its delivery was not therefore interfered with by the outbreak of the war. In order to ensure the maximum efficiency, the radium committee, acting on the advice of Sir E. Rutherford, Sir Wm. Milligan, and other experts, took control of the equipment of the laboratories; and the standardization of the radium was done in the physical laboratories of the University of Manchester. The committee has also drawn up a scheme for the distribution of radium either in the solid form as applicators, or as emanation tubes from the liquid form, to the other hospitals in Manchester and the district. Dr. Arthur Burrows is the radiologist at the infimary responsible for the administration, Mr. H. Lupton is the physicist in charge, and Sir E. Rutherford acts as consulting physicist to the department.

Admiral Peary's arctic ship, the *Roosevelt,* has been sold and it is said that after it has been fitted with oil-burning machinery and other improvements, it will be sold to the Bureau of Fisheries of the Department of Commerce and Labor. The ship will be used in connection with the fisheries service in Alaskan waters, and will proceed through the Panama canal as soon as the refitting has been completed.

The geologists of the University of Texas, including the staffs of the school of geology and the bureau of economic geology, have organized the Texas Geological Club. The purpose of this club is to stimulate interest in geological matters at the university and in geologic research. Monthly meetings will be

held, and papers bearing on matters of geologic interest will be presented. The membership includes the following: F. W. Simonds, J. A. Udden, F. L. Whitney, C. L. Baker, H. P. Bybee, D. J. Jones, W. F. Henneger and Alexander Deussen.

IT is stated in *Nature* that the committee of users of dyes appointed to confer with the British Board of Trade as to a national dye scheme has come to a unanimous decision in favor of the adoption of a scheme which differs in certain important respects from those of the scheme previously made public. The proposal is to form a company with an initial share capital of £2,000,000, of which £1,000,000 will be issued in the first instance. The government will make to the company a loan for twenty-five years corresponding to the amount of share capital subscribed up to a total of £1,000,000, and a smaller proportion beyond that total. The government advance will bear interest at 4 per cent. per annum, payable only out of net profits, the interest to be cumulative only after the first five years. In addition, and with the desire of promoting research, the government has undertaken for a period of ten years to make a grant to the company for the purposes of experimental and laboratory work up to an amount not exceeding in the aggregate £100,000.

UNIVERSITY AND EDUCATIONAL NEWS

UNDER the will of the late General Charles H. Pine, recently published, Yale College will eventually receive an addition of $150,000 to the $50,000 scholarship fund established by General Pine about three years ago. The will also provides for the creation of a fund of $250,000 to be devoted to manual training of Ansonia boys and girls.

BY the will of General William D. Gill, of Baltimore, the Johns Hopkins University is made residuary legatee after the death of his wife. The bequest is to be used for the establishment of a chair of forestry.

AMONG the gifts recently received by Harvard University is one from Mrs. Samuel Sachs, of $2,500 for the purchase of a work or works of art for the Fogg Art Museum, and one of $3,005 from various donors for the Arnold Arboretum.

THE sum of $25,000 has been contributed by Mr. P. S. du Pont toward the University of Pennsylvania Museum extension building fund, which now amounts to more than $100,000. As soon as the fund amounts to half a million dollars, the building of the next extension will be started.

PROFESSOR JOHN A. MILLER, director of the Sproul Observatory of Swarthmore College, has recently been elected vice-president of the college.

DR. RUDOLF HÖBER has been appointed to the chair of physiology at Kiel vacant by the removal of Professor A. Bethe to Frankfort.

DISCUSSION AND CORRESPONDENCE

ON THE PROPOSED REORGANIZATION OF DEPARTMENTS OF CLINICAL MEDICINE IN THE UNITED STATES

TO THE EDITOR OF SCIENCE: Although Dr. Bevan's letter, published in SCIENCE in answer to Dr. Meltzer's, warns college presidents, laymen and university professors who are heads of laboratories to await patiently the findings of committee, consisting largely of practising clinicians, which is now considering the subject of the reorganization of the teaching of clinical medicine, yet in spite of the implied preemption of the subject it seems possible that even a university professor may be allowed to express his views.

For many years scientific work has been accomplished in this country in laboratories associated with the medical sciences, work which has received world-wide recognition. In other instances, clinicians have associated themselves with laboratory men, and have produced results which are known in the great foreign clinics. One might refer to the work of Coleman, of Joslin and of Howland as examples. This represents the cooperation of the laboratory and the hospital which has yielded and is yielding valuable results. There can be no question of the value of sympathetic and friendly cooperation of this sort.

The third stage, that of independent re-

search by the clinician, is the goal toward which the better schools of the country are striving to approach. It is this which led to the recent conditional gifts of $1,400,000 and $750,000 from the Rockefeller Foundation to the Johns Hopkins and to the Washington University. The spirit of modern medicine is that of scientific inquiry into the cause and cure of disease. This spirit can only be imparted by men who are themselves makers of modern knowledge. It is said that science does not explain all things and it is asked why should science be followed? The answer to this question should be, more science, to explain the unknown facts.

It is frequently set forth that there are two subdivisions of medicine, medicine as an art and medicine as a science. The impression is conveyed that medicine as a research science is not the object of a department of medicine. For this reason, the cooperation of the scientific departments is often asked. Innumerable schemes for "correlation" have therefore been presented to various medical faculties throughout the country. "Correlation" in this interpretation signifies that the scientific departments are to give instruction in the clinical years along the lines of the developments of modern scientific research. The oft-repeated request for correlation in this sense shows that there is something lacking in the clinical instruction which should be there.

The medical students of the United States are thoroughly grounded in the fundamental sciences during the early years of association with their schools. The fundamental sciences are largely unknown to the rank and file of the clinical teachers. This leads the latter to ridicule the knowledge which the students, with much labor and care, have sought to acquire. One of two results follow; either the student joins the instructor in belittling the laboratory teaching, or the student, being better informed than the instructor, feels ill satisfied with his opportunities.

The situation is something like this. There is a true scientific medicine based upon the application of research medicine in the clinic. The modern medical student is entitled to this kind of instruction for the fulfilment of his highest development. Can he get this? The answer is found in the argument offered in England as well as in the United States, that the department of medicine should be devoted to the teaching of medicine as an art. It follows that the direction of research is outside its capacity.

Let this problem be examined a little more closely. Many medical schools have recently purchased costly string galvanometers for use in affiliated hospitals. This apparatus is of service in certain diagnoses. As an instrument of research it might perhaps yield a brilliant discovery if used by a man who had been constantly engaged in the study of the phenomena of the circulation during a period of say five years. To the ordinary operator it has no more power of revealing new truths than would a Morse telegraphic outfit.

The truth of the matter is that, as a country, we have produced few men in medical science. This is frankly because the teaching of medicine has not been in accordance with modern science. The staff of the medical department should consist of men, themselves devoted to medical science, capable of carrying it on, brought up in the air of it and blessed by the enthusiasm of it. Such men should be produced under the leadership of the professor of medicine.

The true remedy is that the clinical departments furnish instruction along modern scientific lines. Other remedies are only temporary palliatives. The medical school owes a duty to the public. Personal ambition, even though unconsciously exercised, should not be allowed to frustrate the fulfilment of the duty to the community which the college lives to serve.

The schools are brought face to face with the question whether their policy will be to advance along modern lines or stand still yet a little while.

It is impossible in any faculty to approach this subject without hurting the feelings of true and honorable men, men who deserve well of their country and who are not to blame for the present situation brought about by an

altered trend of educational thought. It is, therefore, extremely difficult to speak of these matters without seeming to be both unkind and unjust. On the other hand, if no word is spoken, blame for cowardice is incurred.

It is the current opinion of the laboratory departments that medicine should be taught as a science by men who are scientific investigators. It is their hope that departments of medicine can be recognized so that this reform can be put into effect. We must think not of ourselves but of the present and the future. Only reorganization along modern lines will bring the best trained students. One needs but have one's touch on the scientific pulse of the country to realize the absolute verity of this statement.

The medical teaching of Friedrich Müller is conceded to be the best in the world. This is his own description of it.

> At half-past eight I go to my institute, at ten to the wards. May I explain? My clinic (at 9 A.M.) is in the theater and to this theater the patients are brought, and I show the patients before my students and examine and explain the cases. This takes an hour, and then I go with a part of my students, which changes every day, to the wards and instruct them personally. This takes another hour. Then I go round the wards with my assistants and it is one or half-past one when I have finished. At least three times and in the winter term four times a week I go to my institute in the afternoon and give a general lecture. I lecture upon the diseases of the brain, the diseases of metabolism, diseases of the respiratory system and so on over certain parts of the whole province of medicine. My assistants are in part municipal, paid for by the state. I have one assistant in biological chemistry, another in chemistry, one working on nervous diseases, one doing bacteriological work and making a vast number of tests, Wassermann tests and so on. If I have a case, say, of typhoid fever, I give the proofs to the assistant last named, if I have a nervous case, to the nerve specialist. Any question of metabolism or chemistry I work out with my chemical assistants, and I work with them. I go on with research work and I do this work in connection with my assistants. . . . I have my own laboratories. I have a large laboratory for chemistry. I have a laboratory for physical examinations and especially for pathological anatomy, then one for bacteriology and for the Wassermann test, and so on. We have a large building for laboratory work connected with my clinic and governed by me. . . . Is it really necessary to incur such great expenses? Would it not be possible to conduct the school for the common practitioner in the old well-established manner? No. The general medical practitioner has always and everywhere to deal with the highest good, with the health of his fellow creatures and he must become more and more even in the remotest village the promotor of public health and therefore he must be an educated man. In his responsible vocation he must have some ideal which elevates him above the daily sorrows and disappointments of life. And he will find his refuge in his science. Only a good scientific education will enable him to follow the progress of medicine with critical understanding. Without a good scientific training he would sink into mere routine.

Let these words sink into the understanding.

Objection may be raised that no man in America is fit to conduct a clinic in any way similar to Friedrich Müller's. To say that is to insult the intellectual capacity of the country. It is admitted to-day that we lead the world in biology and in biological chemistry. To state that it is impossible to conduct medical instruction along the lines of what is admitted to be best, is inexcusable sophistry.

In conclusion, it is suggested that departments of medicine be organized under the leadership of individuals who will develop scientific research, and who will be placed upon a salaried basis with prohibition of private practise during a period of five years. The facilities for medical research in the hospital should be freely open to all at present in connection with the schools. The proper development of this scheme would take the whole of a man's time during the first five years. At the end of that time it will be evident whether it is necessary for a master of medical science to have that sharpening of the wits which an outside consulting practise is supposed to produce.

These words have not been written in a spirit of personal antagonism to men of the older order, for the writer has lived long enough to desire to avoid arousing such antagonism. But he feels that they bear the mes-

sage of the modern educational world and that he would be recreant to his sense of truth if he held his peace. GRAHAM LUSK

LETTER FROM PROFESSOR ED. CLAPARÈDE

J'APPRENDS de divers côtés que "Science" a reproduit une nouvelle d'après laquelle j'aurais dû démissionner de mes fonctions à l'Université de Genève. Cette nouvelle est entièrement inexacte. La presse allemande, qui l'a d'abord propagée, m'a confondu avec un de mes cousins, professeur de droit germanique à Genève; celui-ci a en effet été suspendu provisoirement de son enseignement pour avoir, dans son cours, reproché à la population civile belge d'avoir tiré sur ses agresseurs allemands.

Au moment ou ces incidents se sont produits, j'étais mobilisé, à la frontière, comme médecin d'un bataillon de montagne. J'y suis donc entièrement étranger. Mais, puisque mon nom a été prononcé, permettez-moi d'ajouter, pour éviter tout malentendu, que je ne partage aucunement la manière de voir de mon cousin, dont la mère est allemande, et qui a été lui-même élevé en Allemagne, ce qui explique suffisamment son manque d'objectivité en cette affaire. ED. CLAPARÈDE

FACULTÉ DES SCIENCES DE GENÈVE

SCIENTIFIC BOOKS

Text-book of Embryology. Vol. I. Invertebrata. By E. W. MACBRIDE, M.A., D.Sc., LL.D., F.R.S. London, Macmillan & Co. 1914. Pp. 692.

"The design of this text-book of embryology of which this is the first volume, is to associate the structural development of embryos with broad generalizations of what is known of their physiology. Attention will be drawn, for instance, to the correlation between the function of certain organs of a larva and its habit of life, and, in a more general way, between function and habit and the course of development. Reference will be made to some of the more striking results obtained by experimental embryological research. Attention will be drawn to gaps in our knowledge which indicate promising fields for research."

These words by the editor, Professor Walter Heape, introduce a work which promises to be as useful to the embryologist as is the Cambridge Natural History to the zoologist. Two other volumes are to be included in the work, one on the "Lower Vertebrata" by Professor John Graham Kerr and one on the mammals by Mr. Richard Assheton, both announced to be in press.

The volume before us measures 692 pages and is illustrated by 468 well-executed figures. The treatment is necessarily very succinct, as will be apparent when we consider that Balfour's treatment of invertebrata in his "Comparative Embryology" of 1885 was almost equally extended, and that Korschelt and Heider devoted 1,509 pages to the same groups in 1890–93. Professor MacBride's treatment, of course, includes later investigations also. In each phylum at least one type is selected for detailed description of the entire life history, and in the larger phyla each class may be so represented. Comparative data are then discussed; the experimental embryology is then treated, in some groups at least; and in conclusion the phylogeny of the phylum is considered from the point of view of the developmental history. This method admits both of considerable detail in the treatment of the type forms, and also of succinctness in the consideration of the comparative data. It avoids the vicious habit of constructing life histories from pieces of different ontogenies, and at the same time preserves some advantages of the comparative method.

The descriptive part of Professor MacBride's book is well done, and will be most useful. Special note should be made of the adequate descriptive treatment of cell-lineage hitherto lacking in text-book form. A selected list of literature follows each chapter, and the index appears to be very full. The practical embryologist will find methods of study in many places.

In such a book very much depends on the point of view of the author. The material is so great that rigid selection has to be practised: what is to be rejected, what retained and what principles are to be emphasized? There is no doubt about the point of view of Pro-

fessor MacBride; he stands firmly by the descriptive method, and the phylogenetic point of view as fundamental. All else is secondary: "It is, therefore, of the essence of *comparative embryology* to separate the fundamental ancestral traits of development from the superficial and secondary, and this is the task that has been patiently pursued for the last thirty years." If the results are considered disappointing, this is due largely to the human failing of lack of patience; and if divergences of opinion with reference to phylogenetic problems seem irreconcilable, in what better position are the adherents of the experimental analytical school? Are not opinions equally diverse and irreconcilable there? "The real truth is that experimental embryology is an adjunct and not an alternative to comparative embryology."

As good an illustration of the author's preferred form of generalization as the book affords is contained in the following quotation:

"We are thus led to form the following conception of the past history of the lower Metazoa. A widespread and dominant race of blastula-like animals once swarmed in the primeval seas. Some of these took to a creeping life and eventually gave rise to the group of sponges; others kept to the free-swimming life and developed into planulæ, and so gave rise to the Cœlenterata. Some of these planulæ, by the specialization of the cilia into comblike locomotor organs, became Ctenophora; whilst the remainder adopted a fixed life and attached themselves by their aboral poles. This change occurred in the different divisions of the stock at different stages of the evolution of the internal organs of the planula ancestor, and in this way the groups of Hydrozoa, Scyphozoa and Actinozoa arose."

One is tempted to ask are such questions really the fundamental questions of comparative embryology? No one doubts the broad fact of evolution; nor can it be questioned that embryology is a strong aid to comparative anatomy and paleontology in the investigations of relationships. But the method has its limits, which seem to be surpassed in the above citation.

The experimental method in embryology is not a mere adjunct to comparative embryology of this sort. Indeed, experimental embryology has contributed very little to the phylogenetic interpretation of ontogeny, and in the very nature of things it is impossible that it should do so.

We have in fact two quite radically distinct points of view in embryology, viz.: the comparative anatomical and phylogenetic represented by Professor MacBride, and the functional analytic. Both rest, of course, upon descriptive embryology. Experimental methods are more or less applicable to both. But whereas their use for phylogenetic purposes must be limited to relatively simple purposes, such as determination of origins of parts where purely observational method fails, and can be of no service for the more general problems of phylogeny, experimental methods contribute the essential data for functional analytic problems of embryology, and are absolutely necessary for the investigation of all the more fundamental questions.

The phylogenetic and the functional analytic points of view in embryology diverge from a common basis of observation and experiment. Experimental embryology is not merely an adjunct to comparative embryology. The broadest aspects of phylogenetic embryology must forever, so far as we can see, remain matters of opinion, which can never be subjected to crucial experimental investigation. The reaction against this type of embryological research is therefore due not merely to lack of patience, but also to lack of confidence. That there remains much important work to be done of a purely descriptive character in embryology goes without saying; it is being produced all the time; but in the best works of recent years there is a notable reserve with reference to phylogenetic speculation.

Professor MacBride has selected and limited his material according to his point of view. One result is an altogether inadequate treatment of general and also experimental embryology. In this there is no lack of consistency, and it is therefore not in itself a matter for

just criticism. But certain regrettable mistakes occur in this part of the subject: for instance on page 3 it is stated that the terms oocytes and spermatocytes of the first order are applied to the germ-cells at the end of the period of growth, whereas these names are usually applied from the beginning of this period. On p. 16 the chromosome interpretation of Mendelian phenomena is given incorrectly, but is partially corrected in a footnote; on page 17 increase of "alkalinity" of the sea water is attributed to addition of butyric acid; evidently a slip. On p. 524 Morgan is credited with the discovery of inducing artificial parthenogenesis in sea urchins by treatment with hypertonic sea-water, and Loeb stated to have confirmed this result in 1910. Loeb, of course, made the original discovery in 1899. Several other similar errors occur.

Professor MacBride's volume is to be welcomed as a useful account of descriptive invertebrate embryology. But, to complete the series in which it belongs, there is a need of a volume which shall treat the cytological, functional analytic and general problems of embryology, which seem to the writer to constitute the most significant aspects of the embryological research of the last thirty years.

F. R. L.

An Introduction to the History of Medicine, with Medical Chronology, Bibliographic Data and Test Questions. By Fielding H. Garrison, A.B., M.D. W. B. Saunders Company. 1914. Pp. 1–763, illustrated with numerous portraits of eminent men, to which is appended an extensive bibliography covering 18 pages.

The author, in his preface, states that "the object of this book is to furnish the medical student or the busy practitioner with a definite outline of the history of medicine . . . ." But it is apparent, even on a hasty examination, that the work is capable of much wider usage and may easily be regarded as the most convenient volume of reference on the historical phases of medicine which has been issued recently in the English language. It ranks with the larger and more extensive works of Haeser and of Neuberger, Puschmann and Pagel, though more modest in scope.

The work bears clear evidence of its author's intimate association with the best medical library of the continent and he has made free use of the extensive material in the Surgeon General's library. The volume is chiefly a biographical study of the development of modern medicine, the characters being fully portrayed or briefly mentioned as a particular phase of their career bore an impress on the period or on a certain phase of medicine. One is thus compelled to search in several places for the details of any one man, and even then he finds many only scantily given, this being in accord with the author's views of writing a history of medicine. Both the men involved and the condition of the times in which they worked united to produce the final result.

From the viewpoint of anatomy the work is especially useful. Anatomy has been given its widest application and all phases of biology bearing on the development of medicine have been discussed, with brief or extensive mention of the more eminent men who have had a part in the development of anatomy, not only as directly applied to medicine, but in the purely scientific aspects of the science. Not only is mention made of the men who have been influential in the development of anatomy, but the political conditions of the times in which they worked are discussed. Their more important discoveries are given with, in many cases, exact references to the literature where they were formally discussed; thus adding immensely to the usefulness of the volume. The titles of the more important larger works of many of the prominent anatomists of all time are given, with date and place of publication. The early writers such as Galen, Hippocrates, Fontana and others are treated with especial care and notices of their writings are accompanied by useful notes as to number of editions, translations and commentaries with a statement of which are considered the most authoritative. These notes will save the student just beginning the study of the history of anatomy many blunders and much valuable time.

A glance at the first few chapters will give an idea of the scope of the work.

The first chapter is entitled, "The Identity of all Forms of Ancient and Primitive Medicine." It is a discussion from an ethnological standpoint of what has been determined concerning the condition of medicine among primitive races of ancient and modern times, in which are found traces of modern tendencies in medicine. Chapter II. is given up to Egyptian medicine. The chapter opens with a brief discussion of the fossil remains of man leading up to a statement of the antiquity of Egyptian civilization. Our author says: "At the same time the gap between paleolithic and neolithic man is much greater than that between the people of the late Stone Age and the civilizations of Egypt and Mesopotamia." The following pages are devoted to a discussion of medicine among the Egyptian peoples from the time of the earliest known physician I-em-hetep (4500 B.C.) to the time of the predominance of Greek thought. The most important Egyptian medical documents are the papyri of Brugsch, Ebers and Hearst, the chief of these being probably the Ebers papyrus, which was discovered by Georg Ebers at Thebes in 1872 and dates back to 1550 B.C. It is interesting to note the absence of all anatomical learning in Egypt until the time of the introduction of Greek thought which resulted in the famous Alexandrian school.

Chaper III. is devoted to Sumerian and Oriental Medicine. "To sum up what we owe to Oriental Medicine, the Babylonians specialized in the matter of medical fees, the Jews originated medical jurisprudence and public hygiene and ordained a weekly day of rest, and the Hindus demonstrated that skill in operative surgery which has been a permanent possession of the Aryan race ever since."

Chapter IV. treats of Greek medicine and is divided into three sections: (1) Before Hippocrates, (2) The Classic Period (460–146 B.C.), (3) the Græco-Roman period (146 B.C.–476 A.D.). Chapter V. gives a discussion of the Byzantine period (476–732 A.D.). "Although the Byzantine power lasted over a thousand years (395–1453 A.D.) medical history is concerned chiefly with the names of four industrious compilers (Oribasius, Aetius, Alexander of Tralles, and Paul of Aegina) who were prominent physicians in the first three centuries of its existence." Chapter VI. is devoted to the Mohammedan and Jewish periods (732–1096 A.D.). The titles of the next two chapters, "The Medieval Period" (1096–1438), "The Period of the Renaissance, the Revival of Learning and the Reformation" (1438–1600), will give an idea of the trend of the work.

In a compilation of such magnitude it is impossible that all errors should be avoided, and if attention is called here to a few errors in proof-reading it is with no thought of detraction, but with the hope of adding to the usefulness of the work. On page 24, 13th line from the top *metal work* is evidently intended, instead of mental work as it is printed; on page 184 the last year of Robert Hooke's life was *1703*, instead of 1763 as printed. In the index to personal names the page reference to Carl Ferdinand von Arlt should be *549*, instead of 547, McClung should be *474*, instead of 592. In the index to subjects (p. 761) Sex, determination of, should read *474* instead of 592. These defects are of minor importance, but are rather annoying when one has to search for the correct page. In four weeks' almost continuous use of this volume the above errors are the only ones which have come to my notice.

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THE NATURE AND ORIGIN OF FIORDS

THERE are two groups of geologists whose ideas regarding the origin of fiords are mutually opposed. The first group may be designated as the "glacialists," because in their opinion all the phenomena peculiar to fiords may be explained as the result of extensive glacial over-deepening of pre-glacial river valleys near the sea. The second group, or "non-glacialists," reject the theory of ice erosion, and attempt to account for the phenomena of fiords in other ways.

Members of the non-glacialist group are by no means in agreement among themselves as to the origin of fiords. They agree on one thing only,—that ice did not excavate these deeply submerged canyons. Some consider fiords the product of normal stream erosion followed by a partial submergence which permitted the valleys to be drowned. Others think that peculiar jointing of crystalline rocks enabled streams to carve peculiar valleys which were later submerged. A few even appeal to "some force not yet known to the geologist." Formerly many observers were inclined to regard every fiord as either a gaping chasm or a rift valley formed by the dropping down of a narrow strip of the earth's crust between two parallel faults. This tectonic theory of the origin of fiords, once much in vogue as an explanation for all valleys, is now generally regarded as obsolete. It is this theory which Professor J. W. Gregory defends in a spirited manner, in his recently published book on "The Nature and Origin of Fiords."[1]

Gregory divides his volume of more than 500 pages into three parts. Part I. outlines the problem which fiords present to the geologist, and discusses at much length different classifications of shorelines. Perhaps most readers will feel that here the author has laid undue stress on unimportant details of classifications which are empirical at best, and would have welcomed some attempt at a classification more truly genetic than any of those considered. In Part II., comprising about two thirds of the printed text, the author describes the fiord systems of the world, with the object of proving that the fiords of each district can best be explained on the basis of the tectonic theory. With the fiords of Norway, New Zealand, and other typical fiord areas, he classes the drowned valleys of the Dalmatian coast and other submerged normal river valleys which few besides the author would regard as fiords. Part III. is in part a résumé and amplification of the author's arguments against the glacial theory of fiord formation and in favor of the tectonic theory; and in part an elaboration of a theory of polar oscillations which might fracture the earth in such a manner as to explain the actual distribution of fiords. For in the author's opinion "the ultimate cause of fiords is the rupture of wide areas of the earth by the pulsation due to the titanic forces started by those disturbances which upheaved the existing mountain systems of the world."

The book is abundantly illustrated with sketch maps and diagrams and a limited number of excellent engraved plates. A partial bibliography of the subject of fiords covers 26 pages, while the text is filled with citations from the works of other investigators. Subject, authority and locality indexes are provided. A fairly long "errata" slip suggests inadequate proof-reading, and appears itself to stand in need of revision. Thus a reference to page 468 tells us that the sentence "The occurrence of the chief fiords and mountain-systems on the western sides of the continents is probably a consequence of the rotation of the earth from east to west," should be made to read "is probably a consequence of the rotation of the earth whereby raised areas lay from east to west." (Presumably "lay" should be changed to "lag.") But there is inserted on page 468 another erratum slip which advises us to read the sentence as follows: "The occurrence," etc., "is probably a consequence of the rotation of the earth from west to east, whereby raised areas lag." The reader may take his choice of these corrections; but after he has arranged this sentence satisfactorily his troubles are not over, since three additional corrections must be made in the two sentences which succeed it. Under such circumstances the reader may be pardoned if he is unable to discover what the author meant to say.

A word of explanation may properly precede the more detailed examination of Gregory's book. When an author of recognized ability produces a book which, however valuable, does not contain much novel material nor many

[1] "The Nature and Origin of Fiords," by J. W. Gregory. John Murray, London, 1913. Pp. 452.

new interpretations, a brief summary may give a fair conception of the nature of the work. When an author of no standing advocates unusual or startling interpretations, a very short review may suffice to characterize his effort. But when a writer of good standing, profiting by personal observations over an extended field, decides to support in an elaborate treatise a theory rejected as untenable by most of his colleagues in the science, something more than passing notice is required. "The Nature and Origin of Fiords" is the most elaborate work on this subject which the reviewer can recall. In it the well-known author of "The Great Rift Valley" supports a theory which the reviewer in common with most students of landforms regards as untenable. The reasons for not accepting Gregory's arguments and conclusions should therefore be made plain.

Gregory's book was written primarily to disprove the glacial theory and to establish the validity of the tectonic theory of fiord origin. One might anticipate, therefore, that the author would set forth in the clearest terms the essential points of each theory, and more especially the critically important points of contrast between the two. Only after such an analysis would the reader be adequately prepared to weigh the evidence for and against the theories, and to decide intelligently between them. Unfortunately, while Gregory discusses both theories repeatedly, he presents no adequate analysis of either; and only after the reader has followed with increasing perplexity through a maze of contradictory arguments does he finally discover that the author's conceptions as to what are implied by the glacial and tectonic theories often differ radically from the generally accepted views. In order that we may properly appreciate the author's treatment of this important matter, let us summarize hastily some of the essential elements of each theory.

According to the glacial theory, fiords are partially submerged glacial troughs. The troughs of glaciated mountains far from the sea are similar to fiords, except that the former have not been drowned by marine waters. In both cases the troughs were formed by extensive glacial over-deepening of former river valleys. The preglacial valleys guided the glaciers which later came to occupy them, and by confining the ice streams to the narrow limits imposed by the valley walls insured a maximum efficiency of glacial erosion. The glacial theory asks no questions as to what determined the courses of the preglacial valleys; but it is fully recognized that among other causes ancient fault lines must be considered, since a fault may give a crushed zone which is weaker than the unfractured rock, or may bring a belt of weak rock into such position that subsequent valleys will soon be excavated along it, and hence parallel to the fault.

According to the tectonic theory, on the other hand, fiords are directly due to forces within the earth which cause a pronounced local and recent deformation of the earth's surface. This deformation may be in the nature of a gaping fissure where the rocks have parted along a fault or joint plane; or it may consist of a rift valley or graben caused by the down-dropping of a narrow strip of the earth's crust between two parallel faults. Such depressions may later be modified by river or glacial action; but the essential features of fiord topography must have existed prior to such modification. And whereas, according to the glacial theory, many fiords may be located along fault lines or joints, according to the tectonic theory *every* fiord must be so located.

Without pursuing this contrast further, let us turn again to Gregory's treatment of the problem. His misconceptions of the glacial theory are at once apparent. We have seen that this theory involves the recognition of preglacial river valleys which determined the courses of the more recent ice streams. Yet Gregory devotes a large amount of space to arguing that the valleys existed before the ice came, under the erroneous impression that this is incompatible with the glacial theory. In chapter after chapter this remarkable position is vigorously maintained. Indeed, he tells us that "The most conclusive argument against the glacial origin of the fiords is the preglacial age of their valleys; and it appears

to be admitted for practically all fiord-areas that the valleys are preglacial" (451). "The most fatal objection to the glacial origin of the fiords is the preglacial age of their valleys" (263).

It also follows from the glacial theory that the ice streams, being compelled to coincide in direction with the preglacial valleys, must often pursue courses which make large angles with the general direction of ice advance. Yet our author in combating the glacial theory lays much emphasis upon the fact that fiords are not always parallel to the general movement of the ice. "The distribution and arrangement of these Alaskan and British Columbian fiords is quite inconsistent with the theory of their glacial origin. The development of the fiords appears quite independent of the glaciation of the country; the direction of the fiords is not simply radial from the chief glacial centers" (317–18). "The direction of the ice-movement, however, did not fully agree with the trend of the fiords" (140). "Most fiord countries supply abundant instances of the fiords and the ice-movements having different directions" (451).

A still more serious misapprehension is entertained by the author as to the significance of the oft-observed coincidence between fiords and fault lines. As already noted, the glacial theory of fiord origin fully recognizes the fact that the preglacial valleys, later transformed into fiords, were often excavated along ancient fault lines. To prove the presence of a fault-line through a fiord is therefore to prove nothing as to the glacial or tectonic origin of that fiord. But Gregory is not of this opinion. A very large proportion of his argument against the glacial theory consists simply in showing that faults are associated with fiords. Indeed, he is often content to show that *some* fiords in a region are traversed by faults; or even that faults are known which trend parallel with the fiords of a given region; and on such a basis concludes in favor of the tectonic theory of fiord origin. Often he goes so far as to admit that the fiord-valley was not formed by crustal deformation, but by stream erosion along a crushed or weak rock zone; yet he cites even such cases in support of the tectonic theory, entirely ignoring the all-important distinction between valleys produced by erosion along ancient fault lines, and depressions due to deformation along recent fault lines. The fiords of western Iceland are described as "connected with a series of fractures" (141) while "Faults are numerous around the Greenland coast, and in many cases they coincide with the fiords" (265). "The evidence for these faults (in Alaska) is often obscured, and along the fiords such faults could hardly be recognized; but their recognition by Messrs. Moffit and Capps in the Nizina district renders it probable that intersecting faults may be widely distributed through Alaska, and form planes of weakness along which the fiords have been excavated" (322–23). "The tectonic origin of the (New Zealand) fiords has been recently advocated by Speight. He accepts Andrews' view that they are old river valleys modified by glaciation, but he recognizes that the original course of the valleys was dependent on lines of fracture in the earth's crust" (365). The most pronounced glacialist would accept much of Gregory's lengthy argument against the glacial theory, as a statement of conditions normally to be expected on the basis of that theory.

A careful study of the author's ideas concerning tectonic valleys in the hope of finding some explanation for the apparent lack of consistency in his arguments, only increases one's perplexity. On page 394 we read: "Some valley systems are due to the folding of the earth's crust, which has raised soft bands to the surface, where they are worn into valleys, while the harder rocks resist and remain as ridges. The faulting of the earth's crust also produces bands of weak and shattered rocks which are easily washed away, and thus many valleys have been worn out along fault lines. Joints have a somewhat similar effect. . . . Such valleys, though their directions have been determined by earth movements, are valleys of excavation. Tectonic valleys, on the other hand, are the direct results of the earth-movements themselves." This is a clear

statement of the generally accepted distinction between erosion valleys guided by structure, and tectonic valleys; but it is directly contradicted by the major portion of the author's arguments on the preceding 300 pages of the book. The contradiction is even more amazing when we compare this statement with one on page 455, where tectonic valleys are divided into several groups and one group is defined as follows: "Valleys formed along fault-planes owing to the removal by denudation of a belt of rocks which has been crushed by earth-movements." It is clear that the author's ideas as to what constitutes a tectonic valley, the most vital point in his entire book, were confused and contradictory, and varied from time to time as he wrote. Similar contradictions regarding other matters appear so frequently throughout the book that it is often quite impossible to know what opinion the author really holds regarding essential points in the problem he discusses.

Throughout the book much reliance is placed on *authority*, and hundreds of quotations favorable to the tectonic theory are adduced to strengthen the case for that theory. Many of these quotations date back to a time when the knowledge of land forms was in its infancy; others are from writers unqualified to speak authoritatively on the interpretation of land forms; and occasionally the author quoted wrote in a poetic or figurative sense. In the chapter on Alaskan fiords Gregory writes: "The explanation of these fiords as simply due to glacier corrosion seems to me quite inadequate. That they are due to the action of some tectonic force has been recognized by many visitors to them. Mr. John Burroughs has graphically expressed this view." Then follows this quotation from Mr. Burroughs: "The edge of this part of the continent for a thousand miles has been broken into fragments, small and great, as by the stroke of some earth-cracking hammer, and into the openings and channels thus formed the sea flows freely, often at a depth of from one to two thousand feet." The fact that Mr. Burroughs is not a geologist, and is therefore presumably unacquainted with Alaskan geology, did not deter Gregory from citing this bit of imagery as a substantial confirmation of his theory. Views unfavorable to the tectonic theory are also quoted at length, but are quickly dismissed as untenable. Favorable views are as quickly accepted. In neither case is there any serious attempt to present the quoted author's evidence, review his line of argument, and then subject his conclusions to critical analysis before accepting or rejecting them.

Another reason for accepting Gregory's work with reserve is found in his frequent misinterpretation of the views entertained by authors from whom he quotes. His own belief in the tectonic theory was so strong that he unconsciously read into the works of others ideas favorable to his theory which they did not express. Of the many instances of this I will cite but a few. On page 309 Gregory refers to the work of Tarr and Martin on the Yakutat Bay earthquake, and while he acknowledges that these authors recognized but one fault along Russell fiord, and attributed the present depth and form of the fiords to glacial erosion, he goes on to say that "the shores of this fiord appear to lie along two old faults, the prolongation of which formed the valley occupied by the Hidden Glacier, and movements along the two faults would explain the facts as well as along one fault. This earthquake illustrates how fiord valleys have been formed by parallel trough-faults. . . . Tarr and Martin's memoir shows that the formation of fiord-valleys by trough faulting is still in progress in Alaska." After reading this, one unfamiliar with the memoir in question will be surprised to find that Tarr and Martin considered the faulting hypothesis of origin for these fiords at length, adduced a variety of evidence opposed to this theory, and concluded by showing that it was quite impossible to explain the fiords as a product of faulting. According to Martin the stratigraphic evidence positively proves the absence of two parallel faults. In support of his position Gregory says that in a later memoir Tarr "attached less importance to glacial action" in the formation of fiords.

On the contrary, the memoir cited is a most vigorous argument in favor of the glacial theory of fiord formation. In it Tarr writes: "Of all the hypotheses proposed, glacial erosion alone appears capable of explaining all the facts. . . . The facts set forth in this chapter prove conclusively that ice has eroded in this inlet to a remarkable degree. . . . Those who oppose vigorous glacial erosion are in the position of those who opposed river erosion long after the majority of workers accepted it—that of ultra-conservatism."[2]

Gregory cites Mendenhall's discussion of differential warping in the Cook Inlet region of Alaska, and continues: "These two fiords, therefore, according to Mendenhall, occur along a depression due to earth-movements, and the same explanation offers the simplest interpretation of many other Alaskan fiords and fiord-straits. They appear to be of tectonic rather than of glacial origin" (324). But Mendenhall's report conveys a very different idea.[3] He shows that normal river valleys were occupied by glaciers which "greatly modified" them, and that then these glacially modified valleys were submerged by a depression of the land. Only later, after the fiords had already been in existence for some time, began the differential warping cited by Gregory. As this was an unequal *uplift*, it tended to *destroy* fiords by raising them above the sea-level, not to make them. It is difficult to understand how even an enthusiast for the tectonic theory could find in this faint differential uplift an argument for the tectonic origin of the deep-cut Alaskan fiords. The same might be said of the author's appeal to the differential uplift of the Labrador Coast, as described by Daly, as an explanation for the rock basins and thresholds of Labrador fiords (283); for it is impossible to see how the slight warping of a little more than one foot per mile described by Daly, could account for the reversed slopes of more than 250 feet per mile in the fiords.

Spurr is also quoted in support of the tectonic origin of Alaskan fiords. Gregory writes: "According to Spurr the lake-basins are preglacial. He says that 'all the lakes of southwestern Alaska, so far as observed by the writer, occupy mountain-valleys which are evidently the ancient river-valleys of the late Miocene'" (319). This quotation from Spurr says nothing at all about the preglacial age of the lake basins. The preglacial age of the valleys alone is indicated; and the context from which this quotation was taken makes it quite clear that the lakes, and consequently their basins, are of more recent date.[4]

Gregory's interpretations of his field observations do not always carry conviction. Photographs and sketches of typical glacial troughs with well-developed catenary curves are described as "V-shaped valleys" and "normal denudation curves," apparently because slight bendings of a trough cause the distant profile of one trough wall to intersect the foreground of the opposite wall (Plate V., Figs. 73*d*, 73*e*). It is truly remarkable that such a drawing as Fig. 73*d* could be cited by any one as a "V-shaped valley"; but even more remarkable is the author's attempt to show that the well-known contrast between the forms of glaciated and non-glaciated valleys does not exist (425–32). Although the author has traveled widely, he "can not remember to have seen any considerable mountain-chain or mountain-area in any non-glaciated district which does not show truncated spurs, spurless walls and hanging valleys" (447). The supposed tectonic origin of Cattaro Bay, one of the Dalmatian "fiords," is illustrated by a beautiful photograph of the bay, in which what appear to be triangular "flat-irons" or hogbacks formed by resistant layers in the folded beds, are described as "triangular facets due to faulting" (Plate VI.).

Many readers will hesitate to accept Gregory's arguments because of the significant

[2] R. S. Tarr, "The Yakutat Bay Region, Alaska," U. S. G. S., Professional Paper 64, p. 118, 1909.

[3] W. C. Mendenhall, "A Reconnaissance from Resurrection Bay to the Tana River, Alaska, in 1898," U. S. G. S., 20th Annual Report, Pt. VII., 332–34, 1900.

[4] J. E. Spurr, "A Reconnaissance in Southwestern Alaska in 1898," U. S. G. S., 20th Ann. Rept., Pt. VII., p. 258, 1900.

omissions which characterize the text. Against many of the arguments made by the author, other writers had previously raised very serious objections. We look in vain for any answer to many of these objections, or even mention of them. In the chapter on Dalmatian fiords, there is no intimation of the fact that a normally dissected belt of folded mountains, partially submerged (which is the type of topography found in this region) will necessarily have the long, narrow bays, the steep sided, spurless valley walls, and the short cross-valleys which the author erroneously correlates with those features in fiord districts often described in the same terms, but which really present a distinctly different topographic aspect. The fact noted by the author (202) that one of these drowned valleys has been called a "fiord" in Baedeker's guide book, can not be regarded as very significant. In support of the tectonic theory the author states that the Dalmatian valleys are not arranged like the members of ordinary river systems, as in Dalmatia the branchings and bendings are usually rectangular (207). He does not recognize that in all folded mountain regions involving rock layers of different resistance, the ordinary river valleys normally have this rectangular or "trellised" pattern. His arguments for the tectonic origin of the submerged Dalmatian valleys would apply with precisely as much force to the valleys of the folded Appalachians, the Juras and other similar dissected folds. The short cross valleys are not recognized as a normal product of river erosion across a narrow ridge of hard rock, but are interpreted in accordance with that ancient theory, long ago abandoned by most geologists, which explained the cross valleys as short cracks formed by bending brittle material. The substantial reasons which led geologists to abandon this theory as untenable are not referred to by the author.

It would be easy to multiply indefinitely examples of the unsound reasoning which seems to the reviewer to deprive the book before us of most of its value. The instances I have cited are not isolated examples which might be explained as the result of careless writing, but are typical of the book, as a whole, and must fairly represent the author's mental attitude toward the problem of fiord formation. It seems to the reviewer, therefore, that Gregory's attempt to rehabilitate a discarded theory of fiord formation must be considered a failure.

DOUGLAS W. JOHNSON

SPECIAL ARTICLES

THE IMPORTANCE OF A CONSIDERATION OF THE FIBER PROTEINS IN THE PROCESS OF BLEACHING COTTON

THE nitrogen which is found in the ripe cotton fiber seems to have some bearing upon the yellowing of bleached cotton cloth, as was pointed out by J. C. Hebden in his paper read in Troy before the American Institute of Chemical Engineers.[1] He showed that in the process of bleaching cotton cloth after the first caustic boil 91.5 per cent. of the proteins were removed from the fiber, whereas of the fats and waxes only 20.4 per cent. were removed; and after the second caustic boil 91.7 per cent. of the proteins and only 64 per cent. of the fats and waxes were eliminated; the "chemick" and the "sour" together, he showed, removed 12.05 per cent. of the remaining protein impurities and 10.23 per cent. of the remaining fats and waxes. According to his analysis, after all the bleaching operations there were still left on the fiber 30.4 per cent. of the total fatty and waxy impurities, whereas of the total proteins there were left only 7.3 per cent., and as the cloth which he analyzed had undergone a "good bleach," he felt safe in inferring that it is the failure to remove the protein impurities from the cotton that results in a "bad bleach" or causes the yellowing of cloth in steaming or during storage.

So far as we know, the investigator above referred to was the first to point out the possibility that the proteins of the fiber played such a part in the bleaching of the cloth. Previous to this it has been believed that the fatty and waxy matters and especially the

[1] *Journal of Industrial and Engineering Chemistry*, September, 1914, Volume 6, No. 9, page 714.

pectins were chiefly responsible for the yellowing of the fiber, since they formed water insoluble compounds, which remained on the fiber. The analysis of Hebden, however, showed that the calcium fixed on the fiber in the form of calcium salts was decomposed by the following acid treatments, and he explained the presence of the calcium on the fiber after the sour by the formation of a calcium cellulose similar to that of soda cellulose. The possibility of the formation of such a cellulose, he believed, was supported by the fact that cotton cloth which has been boiled and bleached did not produce as clear and as brilliant a turkey-red as cloth which had been simply boiled, because the former was not in a condition to fix calcium.

As the result of investigation in this line on cloth from different bleacheries, it occurred to us that an analysis of the growing cotton fiber with a view of determining the nitrogen and the fat and wax factors might reveal some points of importance. The determinations were carried out on Durango cotton raised on the United States Experiment Farm, San Antonio, Texas.[2]

The nitrogen factors were determined by the Kjeldhal-Gunning method, and the fat and wax factors by extracting samples of the fibers first by ether and then by alcohol. Some of the experiments were carried out in duplicates and some in triplicates, and the averages of the determinations were recorded as the final results. The figures given in the table below can only be regarded as approximating the absolute values of the nitrogenous and fatty and waxy constituents of the fiber; for the determination of exact values a much larger number of experiments should be performed. Nevertheless, they show the tendencies of the two factors and have, therefore, significance. The nitrogen determinations were made and recorded beginnings from the 14–16-day stage up to the 36–38-day stage, whereas the ether and the alcohol extracts were recorded only beginning with the 22–24-day stage, because in the stages previous to this the amount of tannins extracted by both ether and alcohol were much higher than the fats and waxes.

Age in Days from Flowering	Nitrogen in Per Cent.	Protein N. × 6.25	Alcohol Extr. in Per Cent.	Ether Extr. in Per Cent.	Fat and Wax in Per Cent.
14–16	2.2300	13.938	....	....	....
16–18	1.9480	12.175	....	....	....
18–20	1.4250	8.907	....	....	....
20–22	1.1820	7.388	....	....	....
22–24	....	....	4.405	2.819	7.225
24–26	.3760	2.350	1.745	.775	2.418
26–28	.3195	1.997	1.398	.713	2.111
28–30	.3123	1.952	1.415	.800	2.215
30–32	.2657	1.661	1.522	.782	2.304
32–34	.2590	1.619	1.536	.709	2.245
34–36	.2503	1.564	1.403	.802	2.205
36–38	.1815	1.134	1.409	791	2.200

From the above table it may be seen that the fats and waxes showed neither a gradual increase nor a gradual decrease in their percentages, and in view of the fact that the fiber was growing, it seems reasonable to suppose that the fatty and waxy substances increased proportionally as did the fiber. We believe that were the numbers of the experiments large enough to give averages approximating the absolute values of the fatty and waxy factors, this point would have been brought out much clearer. But even from the determinations which we can report, it appears that the fats and waxes extended in an even and constant thickness over the fiber. If we accept the view that the function of these substances is to protect the fiber from external influences of weather and disease, that is that they are merely external coats of the fiber, the significance of such a proportional growth of these constituents becomes clear. If, however, the fats and waxes are phosphotides taking part in the growth, there would also be a proportional increase. The nitrogen figures, on the other hand, show gradual decrease in percentage with the increase of the age of the fiber. The sudden increase of the factor at the 20–22-day stage as compared with that of the 24–26-day stage may be due either to a rapid growth of the nitrogenous constituents of the fiber or to the adhering nitrogenous coloring matters of the parts of the boll which surrounded the

[2] We wish to thank Mr. Rowland D. Mead, of the United States Department of Agriculture, for supplying us with the necessary samples of the cotton fibers.

fibers. If we limit ourselves to a consideration of the nitrogen figures of the samples representing only the higher stages of development of the cotton fiber even then we are permitted to assume that the nitrogen was deposited early in the lumen of the fiber and its absolute value remained constant. This assumption becomes more plausible when the nitrogen figures are multiplied by 6.25 to express the percentage of proteins present in the fiber. Most of this early and constant protein deposit remains in the lumen in the form of insoluble albuminoids and in the form of alcohol soluble proteins; some of it is utilized by the growing fiber, probably by the spiral forming the walls of the lumen. That the proteins of the fiber are of an insoluble nature is shown by the fact that the percentage of nitrogen of gray cloth as obtained by Hebden (0.191 per cent.) remained practically unchanged after the "steep" (0.192 per cent.), and that some of it exists in the fiber in the form of alcohol soluble proteins, is shown by the number which he obtained for nitrogen after extracting the cloth by ether and alcohol. The percentage, as shown in his table, was reduced from 0.191 per cent. to 0.161 per cent. The fact that the first caustic boil removed 91.5 per cent. of the protein content clearly points to the decomposing action of boiling alkali upon the albuminoids.

The 7.3 per cent. of total protein content remaining in the fiber after all the operations of the bleaching process can be considered as that part of the fiber proteins which has become an inseparable part of the wall of the lumen. The lowest percentage for fats and waxes (2.200 per cent.) obtained by us for the fiber taken directly from the field was considerable higher than that obtained by Hebden for fibers which were ginned, carded, spun and woven (1.405 per cent.). The removal of a large part of the fats and waxes by mechanical means during ginning, carding, spinning and weaving proves that these constituents form the outside cover of the fiber, and it is reasonable to suppose, therefore, that they do not play as important a part in bleaching as is ascribed to them. The percentage of nitrogen in our experiment (0.1815 per cent.) was somewhat smaller than that obtained by Hebden for cotton in the form of cloth (0.191 per cent.) and points to the fact that, unlike the fats and waxes, the proteins of the fiber are not adventitious nor coating factors, but that they are within the lumen or are in part intimately bound to the fiber. As the proteins are of the insoluble kind, the above seems to justify the assumption of Hebden that in bleaching the removal of the proteins may be of more importance than that of the fats and waxes.

These results and the results of Hebden show the necessity of a careful investigation of the chemical nature of the fatty and waxy substance as well as of a further study of the effect of growth on these constituents of the cotton fiber.

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THE AMERICAN PHYTOPATHOLOGICAL SOCIETY

THE sixth annual meeting of the American Phytopathological Society was held in the medical building of the University of Pennsylvania, Philadelphia, Pennsylvania, December 29, 1914, to January 1, 1915. About 95 members were present; 7 new members were elected, making a total of 293. The following officers were elected for 1915:

President—H. H. Whetzel.

Vice-president—W. A. Orton.

Councilor—Mel. T. Cook.

Donald Reddick was elected editor for three years and made chairman of the board. The following associate editors were elected for three years: H. W. Barre, E. A. Bessey, H. R. Fulton, W. T. Horne.

C. L. Shear was elected business manager vice Donald Reddick.

The society decided to hold its next annual meeting at Columbus, Ohio, in connection with the American Association for the Advancement of Science.

A special meeting is to be held at San Francisco, August 2 to 7.

The committee on common names of plant diseases submitted a report which was ordered distributed to the members of the society for suggestion and criticism.

The society instructed the secretary to select two other persons, as required by law, and proceed to incorporate the society under the laws of the District of Columbia.

The society received greetings by telegraph from the newly organized Western Branch meeting at Corvallis, Oregon. The following resolution was adopted by the society:

"The council recommends that the society extend cordial greetings to the newly organized Western Branch of the American Phytopathological Society, and also recommends that a committee consisting of the present president, Haven Metcalf, and the secretary, with power to increase their number to five, be authorized to formulate the necessary terms of affiliation to provide for this and other future branches which may be organized."

The following constitutional amendment proposed at the last meeting was adopted:

Article 3, section 3, shall be changed to read: "Any person may become a patron upon the payment of $100."

The method of presenting papers by abstract introduced at the Atlanta meeting was continued, with slight modifications, with much success. Six minutes were allowed for the presentation of each paper, the author being permitted to read the abstract as printed, or use the allotted time in giving additional explanations or presentation of the topic, after which five minutes were allowed for discussion. The same method of handling the program was adopted for the future and the secretary authorized to limit the time for the acceptance of titles and abstracts to December 1, in order that they might be published in the December issue of *Phytopathology*.

The following resolution in regard to the *Urophlyctis* disease of alfalfa was adopted:

Whereas, The plant pathologists or other officials of the individual states are unable properly to meet the situation, partly from lack of information, partly because it is essentially on international and interstate problem, be it therefore

Resolved, That we respectfully invite the attentention of the Honorable Secretary of Agriculture and other officials of the U. S. Department of Agriculture to the above facts and urge the importance of immediate earnest investigation under their leadership as to the present occurrence and seriousness of the disease, as to its means of distribution and as to what steps, if any, should be taken to check its further spread.

The society passed a unanimous vote of thanks to the local committee for the excellent facilities and courtesies offered the society during the meeting, and to Dr. F. D. Heald for the care of the exhibits and other assistance in promoting the success of the meeting; also to the chair for conducting the meeting with promptness and carrying the program through on time.

The following program of 58 papers was presented:

Tuesday, Joint Session with Section G, American Association

Meeting of the council and board of editors, Hotel Walton.

December 30, 1914

"The *Verticillium* Wilt Problem," by C. W. Carpenter.

"Orchard Experiments in 1914," by Mel. T. Cook and G. W. Martin.

"A Nursery Disease of the Peach," by Mel. T. Cook and C. A. Schwarze.

"A Method for Excluding Mites from Pure Cultures," by C. W. Carpenter.

"Studies of the genus *Phytophthora*," by J. Rosenbaum.

"A Bacterial Leaf Spot Disease of Celery," by Ivan C. Jagger.

"The Spindling Sprout Disease of Potatoes," by F. C. Stewart.

"Thrombotic Disease of Maple," by W. H. Rankin.

"Mutation in *Phyllosticta*," by C. Harvey Crabill.

"A *Nectria* Parasitic on Norway Maple," by Mel. T. Cook.

"An Unreported Fungus on the Oak," by C. A. Schwarze.

"The Use of Sulphur for the Control of Potato Scab," by H. Clay Lint.

"*Citrus* Canker," by A. B. Massey.

"The *Citrus* Canker Situation," by R. Kent Beattie.

Meeting with the Botanical Society of America

Symposium: Genetic relationship of organisms.

December 31, 1914

"Leaf-spot and Some Fruit Rots of Peanut," by Frederick A. Wolf.

"Hosts of Brown-rot *Sclerotinia*," by J. B. S. Norton.

"Resistance to *Cladosporium fulvum* in Tomato Varieties," by J. B. S. Norton.

"Loss from Mosaic Disease of Tomato," by J. B. S. Norton.

"Notes on Soil Disinfection," by Carl Hartley.

"A Wilt Disease of Japanese and Hybrid Plums," by B. B. Higgins.

"The Perfect Stage of *Phyllosticta paviae* Desm," by V. B. Stewart.

"Studies on *Plasmopora viticola*," by C. T. Gregory.

"A New Rust of Economic Importance on the Cultivated Snapdragon," by Geo. L. Peltier and C. C. Rees.

"The Relation between *Puccinia graminis* and

Host Plants Immune to its Attack,'' by E. C. Stakman.

''Further Studies on the Spread and Control of Hop Mildew,'' F. M. Blodgett.

''The Longevity of Pycnospores and Ascospores of *Endothia parasitica* under artificial conditions,'' by F. D. Heald and R. A. Studhalter.

''Field Studies of Apple Rust,'' by N. J. Giddings and Anthony Berg.

''Cotyledon Infection of Cabbage Seedlings by the Bacterial Black Rot,'' by Charles Drechsler.

''Fungus Host Relationship in Black Knot'' (with lantern). by E. M. Gilbert.

''Stigmonose: A Disease of Fruits,'' by M. B. Waite.

''Jonathan Spot, Bitter Pit and Stigmonose'' (with lantern), by Charles Brooks and D. F. Fisher.

''The Organization of the Plant Disease Survey,'' by R. Kent Beattie.

''Some Technical Aids for the Anatomical Study of Decaying Wood'' (with lantern). by E. W. Sinnott and I. W. Bailey.

''Apple Rots'' (with lantern), by Charles Brooks, D. F. Fisher and J. S. Cooley.

''The Relation of Temperature to the Infection of Cabbage by *Fusarium conglutinans* Wollenw,'' by J. C. Gilman.

''Third Progress Report on Fusarium Resistant Cabbage'' (with lantern), by L. R. Jones.

''York Spot and York Skin Crack'' (with lantern), by H. S. Reed.

''Soil Stain and Pox, Two Little-known Diseases of the Sweet Potato'' (with lantern), by J. J. Taubenhaus.

''*Rhizoctonia* in America'' (with lantern), by Geo. L. Peltier.

''Lightning Injury to Cotton and Potato Plants,'' by L. R. Jones and W. W. Gilbert.

''Orchard Experiment with Jonathan Spot Rot in 1914,'' by G. W. Martin.

''The Perfect Stage of the Fungus of Raspberry Anthracnose,'' by W. H. Burkholder.

January 1, 1915, Business Meeting

''Parasitism, Biology and Cytology of *Eocronartium typhuloides* Atk.,'' by Harry M. Fitzpatrick.

''Negative Heliotropism of the Urediniospore Germ Tubes of *Puccinia rhamni*,'' by F. D. Fromme.

''The Ascigerous Stage of *Helminthosporium teres* Sacc.,'' by A. G. Johnson.

''A Gymnosporangium with Repeating Spores,'' by J. C. Arthur.

''A Preliminary Report on Twig and Leaf Infection of the Peach by Means of Inoculations with *Cladosporium carpophilum* Thüm,'' by G. W. Keitt.

''Notes on *Cronartium comptoniae* and *C. ribicola*,'' by Perley Spaulding.

''How to Know the Polypores,'' by W. A. Murrill.

''Some Problems of Plant Pathology in Reference to Transportation,'' by F. L. Stevens.

''A Disease of Red Clover and Alsike Clover Caused by a New Species of Colletotrichum,'' by P. J. O'Gara.

''An Anthracnose of *Asclepias speciosa* Caused by a New Species of Colletotrichum,'' by P. J. O'Gara.

''A Disease of the Underground Stems of Irish Potato Caused by a New Species of *Colletotrichum*,'' by P. J. O'Gara.

''A Preliminary Report on the Relation of Grass Rusts to the Cereal Rust Problem,'' by E. C. Stakman.

''Some Facts of the Life History of *Ustilago zeae* (Beckm.) Unger,'' by Frank J. Piemeisel.

''A Promising New Fungicide,'' by W. M. Scott.

''The Potato Study Trip of 1914,'' by W. A. Orton.

''Some Effects on Chestnut Trees of the Injection of Chemicals'' (with lantern), by Caroline Rumbold.

C. L. SHEAR,
Secretary-Treasurer

THE PHILADELPHIA MEETING OF THE AMERICAN PSYCHOLOGICAL ASSOCIATION

THE twenty-third annual meeting of the American Psychological Association was held on December 29, 30 and 31, 1914, in affiliation with the American Association for the Advancement of Science and the Southern Society for Philosophy and Psychology at the University of Pennsylvania, Philadelphia. Professor Robert Sessions Woodworth, of Columbia University, presided.

As president of the association for the ensuing year, Professor John B. Watson, of the Johns Hopkins University, was selected. As members of the council, to succeed Professors Max Meyer and Margaret F. Washburn, Professors Roswell P. Angier, of Yale University, and Walter Dill Scott, of Northwestern University, were chosen. The association's representative upon the council of the American Association for the Advancement of Science will be Dr. Thomas H. Haines, of Columbus, Ohio.

It was decided to hold a special meeting for the reading of papers at San Francisco, in affiliation with the American Association for the Advancement of Science. The dates of this meeting will fall within the time selected by the larger association, August 2–7, 1915. The organization of this special meeting, and all arrangements pertaining to the program, etc., was left in the hands of a committee appointed by the president. This committee consists of Professor G. M. Stratton, University of California, chairman, and Professors Lillien J. Martin and Warner Brown. The place of the twenty-fourth annual meeting, to be held as usual during Convocation Week of 1915, was left

to the decision of the Council, and will be determined shortly.

A special feature of the business session which aroused much interest and discussion was the report of the Committee on the Academic Status of Psychology. This committee, made up of Professor H. C. Warren, Princeton University, chairman, and Professors John Dewey and Charles H. Judd, presented a comprehensive report in printed form, based upon data secured from 165 colleges and universities. The results indicated, among other things, that psychology is still constrained in many institutions to furnish the foundation for work in philosophy and education, and thus lacks the autonomy requisite in developing its own special interests and problems. Three resolutions offered by the committee were adopted by the association: (1) That a standing committee be appointed to continue the work here begun. (2) that a topic bearing upon the teaching of psychology be chosen for discussion at the next annual meeting. (3) That the association adopt the principle that the undergraduate psychological curriculum in every college or university great or small, should be planned from the standpoint of psychology, and in accordance with psychological ideals, rather than to fit the needs and meet the demands of some other branch of learning.

The program of the association included the reading of some forty-five papers. Joint sessions were held with Section L of the American Association for the Advancement of Science, and with the Southern Society for Philosophy and Psychology. As a whole, the program was notable for the evident interest of the participants in the pursuit of introspective psychology under experimental conditions. The keynote was struck by President Woodworth in his address, "A Revision of Imageless Thought," in the course of which an interesting theory of "mental reaction" was propounded to account for certain non-sensory contents of consciousness as revealed by introspective studies. Another feature was the discussion with demonstration of the introspective method, as conducted by Professor J. W. Baird, of Clark University, with the assistance of several of his former students and colleagues.

The papers read were as follows:

"Habit Formation and Modern Language Teaching," by Stuart H. Rowe.

"Initial Speed and Total Gain in Learning," by E. A. Kirkpatrick.

"Notes on Certain Phases of Learning," by S. S. Colvin.

"Some Learning Curves," by M. E. Haggerty.

"Some Norms of College Freshmen," by W. V. Bingham.

"A Study in Mental Retardation in Relation to Etiology," by Bird T. Baldwin.

"A Method for Qualitative Study of Family Likeness in Arithmetical Abilities," by Margaret V. Cobb.

"Effect of Heat, Humidity and Stagnancy of Air upon Mental Work," by E. L. Thorndike.

"Notes on Affective Physiology," by George V. N. Dearborn.

"Variations in Distribution of the Motor Centers of the Monkey Brain," by S. I. Franz.

"Some Relations of Mania to the Sensorium," by E. E. Southard.

"Some Cases of Paramnesia," by Nathan A. Harvey.

"Some Technical Results from the Alcohol Program," by Raymond Dodge.

"An Apparatus for Testing Visual Sensitivity to Contrast in Animals," by H. M. Johnson.

"Apparatus for Serial Exposure in Memory Experiments," by E. H. Cameron.

"Model Animal Maze," by C. Homer Bean.

"Tactimeter," by C. Homer Bean.

"Puzzle Box for Illustrating Problem-Solving Learning, and for Testing Mechanical Ability; a Form of Mirror-Drawing Apparatus which allows Modification of the Movement-Stimulus Relation; Mirror Frame for Observing Eye-Movements," by Frank N. Freeman.

"Tachistoscope," by F. C. Dockeray.

"A Self-recording Hand Dynamometer," by Henry C. McComas.

"Pictures and Class Experiments," by E. A. Kirkpatrick.

"A Proposed Classification of Mental Functions," by George A. Coe.

"The Temporal Relations of Meaning and Imagery," by Thomas V. Moore.

"Psychology of Slavic People," by Paul R. Radosavijevich.

"The Craving for the Supernatural," by Tom A. Williams.

"The Study of Dreams: A Method Adapted to the Seminary," by Madison Bentley.

"Concerning the Religion of Childhood," by W. T. Shepherd.

"The Point Scale Method of Measuring Mental Ability," R. M. Yerkes.

"The Point Scale Rating of Delinquents," by Thomas H. Haines.

"Correlations between the Binet Tests and other Mental and Physical Tests," by Edward K. Strong, Jr.

"Norms of Negro Mentality," by W. H. Pyle.

"The Standardization of Knox's Cube and Feature Profile Tests," by Rudolf Pintner.

"On the Memory for Musical Sequences," by Kate Gordon.

"Effects of Practise on the Singing and Discrimination of Tones," by E. H. Cameron.

"The Vowel Character of Fork Tones," by A. P. Weiss.

"The Influence of Expectation on Sound Localization," by L. R. Geissler.

"Individual Differences in Fluctuations of the Attention," by Henry C. McComas.

"Awareness and Partial Awareness as Factors in Efficiency," by G. F. Arps.

"The Acquisition of Skill in Archery," by K. S. Lashley.

"A New Method of Studying Ideational and Allied Forms of Behavior in Man and other Animals," by R. M. Yerkes.

"A Preliminary Report on Number Reactions in the Dog," by A. H. Sutherland.

"The Visual Difference-Threshold for Size in the Monkey and the Domestic Chick," by H. M. Johnson.

"Two Cases of Criminal Imbecility," by Henry H. Goddard.

"The Value of Anthropometric Measurements in the Diagnosis of Feeblemindedness," by E. A. Doll.

"The Influence of Improvement in one Simple Mental Process upon Other Related Processes," by A. T. Poffenberger, Jr.

"A Revision of Imageless Thought," address of the president, by Robert Sessions Woodworth.

"The Introspective Method, with Demonstrations," by J. W. Baird.

"A Preliminary Report of an Introspective Study of the Process of Comparing," by Samuel W. Fernberger.

"An Experimental Investigation of the Process of Recognizing at Different Stages of its Mechanism," by Elizabeth L. Woods.

"An Experimental Study of Generalizing, Abstraction and the General Concept," by S. Carolyn Fisher.

"Determination of the Psychologically Unitary Color Sensations," by Christine Ladd-Franklin.

"External Localization in Memorizing Verbal Material," by Eleanor A. McC. Gamble.

"Affective Factors of Recall," by Garry C. Myers.

"An Experiment on Choice Reaction," by Prentice Reeves.

"The Function and Test of Definition and Method in Psychology," address of the retiring Vice-president of Section H, by Walter Bowers Pillsbury.

"Report of the Committee on the Academic Status of Psychology," by Howard C. Warren.

R. M. OGDEN,
Secretary

THE ILLINOIS ACADEMY OF SCIENCE

THE eighth annual meeting of the Illinois Academy of Science was held at the State Museum, Springfield, February 19 and 20. The Friday afternoon program consisted of four addresses: "The Chemistry of Colloids," Dr. D. A. MacInnes, University of Illinois; "Colloids in Physiology," Dr. William Crocker, University of Chicago; "Colloids in Commerce" (read by title), Dr. L. I. Shaw, Northwestern University; "Recent Developments in Surgery," Dr. Don W. Deal, Springfield.

In the evening the members of the academy were the guests of the Springfield Commercial Association at a banquet served at the Leland Hotel. Ex-Governor Northcott acted as toastmaster, and short addresses were made by Senator Kelly and Professor John M. Coulter.

The evening lecture was delivered by Dr. Day, director of the Carnegie Geophysical Laboratory, Washington, D. C., on "Volcanic Emanations."

The Saturday morning program included the following papers:

Section of Botany, Bacteriology and Chemistry

"Character of Water Used on Railway Trains," by Dr. Edward Bartow, University of Illinois.

"Comparison of Rocky Mountain Grassland with the Prairie of Illinois," by Dr. George D. Fuller.

"Studies in *Phyllosticta* and *Cercospora*," by Miss Esther Young.

"The Arsenic Content of Filter Alum Used in Illinois Water Purification Plants," by Mr. A. N. Bennett.

"Method of Determining the Life Duration of Seeds," by Mr. James F. Groves.

"Studies on *Schizophyllum alneum* in Respect to Cultures and Inoculations," by Mr. Alvah Peterson, University of Illinois.

"The Longevity of *B. Coli* and *B. Typhosus* in Water," by Mr. M. E. Hinds.

"Peculiar Examples of Plant Distribution," by Dr. H. S. Pepoon.

"Manganese in Illinois Water Supplies," by Mr. H. P. Corson.

"Some Features in the Classification of *Septoria* and *Parodiella*," by Mr. Philip Garman.

"Comparison of Methods of Determining Dissolved Oxygen in Water and Sewage," by Mr. F. W. Mohlman.

"The Grasses of Illinois," by Miss Edna Mosher.

"A Florida Smut in Illinois," by Miss Margaret Mehlkof.

"The Violets of Illinois," by Mr. Rufus Crane.

Section of Zoology, Entomology and Geology

"What California is Doing in the Control of Injurious Insects," by Miss Gertrude A. Bacon.

"The Labium of the Nymphs of Zygoptera," by Mr. Philip Garman.

"The Comparative Morphology of Some Carabid Larvæ," by Mr. Clyde C. Hamilton.

"The Loess in Illinois: Its Age and Origin," by Dr. T. E. Savage.

"Recent Crustal Movements in the Great Lakes Region," by Professor Charles E. Decker.

"A Restudy of Worthen's Type Section of the 'Productive Coal Measures' for Central and Western Illinois," by Dr. T. E. Savage.

"The Prothonotary Warbler," by Dr. W. S. Strode.

"Some Adaptations for Respiration in Aquatic Hemiptera," by Miss Anna G. Newell.

"Mouth Parts of the Blow-fly," by Mr. Alvah Peterson.

"Collecting Snail Shells," by Mr. James H. Ferris.

'The Morphology of Certain Sphinx Pupæ," by Miss Edna Mosher.

On Saturday afternoon addresses were delivered by Ex-Governor Northcott, and the retiring president, Dr. A. R. Crook, on "The Relation of Academies of Science to the State."

The officers elected for the coming year are:

President—Dr. U. S. Grant, Northwestern University, Evanston.

Vice-president—Dr. E. W. Washburn, University of Illinois, Urbana.

Secretary—Dr. A. R. Crook, State Museum, Springfield.

Treasurer—Dr. H. S. Pepoon, Lake View High School, Chicago.

The 1916 meeting will be held at the University of Illinois.

E. N. Transeau,
Secretary

SOCIETIES AND ACADEMIES

THE BOTANICAL SOCIETY OF WASHINGTON

The one hundred and second regular meeting of the Botanical Society of Washington was held in the Assembly Hall of the Cosmos Club at 8 P.M., on Tuesday, February 2, 1915. Fifty-two members and six guests were present. Dr. P. A. Yoder and Messrs. Stephen Anthony and James M. Shull were elected to membership. The following scientific program was presented:

Bamboo Possibilities in America: Mr. S. C. Stuntz.

After a brief introductory statement outlining the past history of bamboo introduction into the United States, and sketching the present condition of bamboo planting in this country, attention was directed to the possible future uses for bamboo. Furniture, basketry, especially for parcel post shipments, Venetian blinds and barrel hoops were suggested as probable industries in which bamboo would find use, while the development for ornamental planting and as a possible stock for paper was especially emphasized. Lantern slides of bamboo plantations and uses abroad and in the United States were shown, together with a considerable exhibit of manufactured bamboo articles.

Botany of Cacao and Patashte: Mr. O. F. Cook.

The patashte tree is a relative of the cacao, known to botanists under the name *Theobroma bicolor* Humboldt and Bonpland. It has dimorphic branches like cacao, the lateral branches being formed in whorls at the ends of the upright shoots, but only 3 laterals in a whorl, instead of 5 or 6, as in cacao. Many other differences in leaves, inflorescences and flowers were shown. The inflorescences of patashte are confined to new growth at the ends of the lateral branches, while cacao is caulocarpous, with all of the flowers produced from the old wood on the trunk and larger limbs of the tree. The various features were explained with lantern-slide illustrations, and the paper was followed by a brief discussion of the question whether trees with such numerous and definite differences should be classified in the same genus.

Rediscovery of Lignum nephriticum: Mr. W. E. Safford.

Lignum nephriticum is a remarkable Mexican wood which was celebrated throughout Europe in the sixteenth, seventeenth and the early part of the eighteenth centuries, not only for its reputed

medicinal properties, but on account of the wonderful fluorescence of its infusion in spring water. Scarcely a fragment of this wood is now to be found in drug collections, and its very name has disappeared from encyclopedias. It is celebrated as the substance with which the Hon. Robert Boyle made his first investigations in the phenomenon of fluorescence. After giving a history of the literature on the subject Mr. Safford called attention to the confusion surrounding the origin of the wood, and the causes which prevented its botanical identification. For the first time specimens of the wood accompanied by herbarium material of the plant from which it was obtained have been the subject of critical study. The heartwood produced the characteristic fluorescence described by Robert Boyle, and the botanical material corresponded with the original description of Hernandez of the plant yielding *lignum nephriticum*. This proves to be *Eysenhardtia polystachya* (Ortega) Sargent (*Viborquia polystachya* Ortega, *Eysenhardtia amorphoides* H. B. K.). The lecture was illustrated by lantern slides, specimens of the wood and botanical material, photographic enlargements of sections of the wood made by Dr. Albert Mann, plant morphologist; and also by exhibition of the fluorescence of the extract of the wood in the rays of an arc light by Dr. Lyman J. Briggs, Biophysicist, Bureau of Plant Industry, with remarks as to the value of *lignum nephriticum* as an indicator in titrimetric determinations.

THE one hundred and third regular meeting of the Botanical Society of Washington was held in the Crystal Dining Room of the New Ebbitt Hotel, at 6:45 P.M., Tuesday, March 2, 1915. Eighty-two members and seventy-eight guests were present, this being the regular annual open meeting for the president's address.

A dinner preceded the scientific program.

The retiring president, Dr. C. L. Shear, gave an address on "Mycology in Relation to Phytopathology." This appears in full elsewhere in SCIENCE.

Dr. A. S. Hitchcock presented to the society the plans for a proposed publication of a local flora on the flowering plants and higher cryptogams of Washington and the vicinity. It is proposed that this be published about one year from the present time.

The society also passed resolutions of regret upon the death of Dr. Charles E. Bessey.

PERLEY SPAULDING,
Corresponding Secretary

BIOLOGICAL SOCIETY OF WASHINGTON

THE 535th meeting of the society was held in the Assembly Hall of the Cosmos Club, Saturday, February 6, 1915, called to order by Vice-president Hopkins at 8 P.M., with 35 persons present.

Under heading Book Notices, Dr. Ransom called attention to a new biological journal under editorship of Professor Ward, of the University of Illinois, to be devoted to animal parasites.

Under heading Brief Notes, Treasurer Cooke read a letter from Dr. B. W. Evermann, now of San Francisco, a former president of the society, expressing his regret at not being able to attend meetings, his deep interest in the society, and wishes for its continued prosperity.

The first paper of the regular program was by Dr. T. Wayland Vaughan, "Remarks on the Rate of Growth of Stony Corals." Dr. Vaughan reviewed the work done by previous investigators and gave result of his own carefully conducted experiments at Tortugas. The paper was fully illustrated by lantern slides showing apparatus and methods employed in planting corals and results of one and of several years' growth of various corals.

The second paper of the regular program was by Dr. J. N. Rose, "Botanical Explorations in South America." Dr. Rose spoke concerning a botanical exploration on the west coast of South America which he made during the summer and fall of 1914. He stated that when he took up the study of the Cactaceæ for the Carnegie Institution of Washington, it was with the understanding that it should embrace not only herbarium and greenhouse studies, but extensive field work in all the great cactus deserts of the two Americas. His going to the west coast was therefore simply part of a large scheme for botanical exploration. He further stated that plans had been made for similar field work in the deserts of the east side of South America during the coming summer. He gave detailed accounts of his work in the deserts of Peru, Bolivia and Chile, and the peculiar Cacti which he found, described particularly the climatic conditions in those countries, and told of the remarkable crescent-shaped sand dunes of southern Peru. On this trip Dr. Rose collected more than a thousand numbers, obtaining not only herbarium and formalin, but also living material. His collection of living plants which was very large has been sent to the New York Botanical Garden. Dr. Rose's communication was illustrated by maps of the regions traversed, by apparatus used in collecting speci-

mens, and by preserved specimens. The paper was discussed by Messrs. Hitchcock, Vaughan, Goldman and Townsend.

The 536th meeting of the society was held in the Assembly Hall of the Cosmos Club, Saturday, February 20, 1915, called to order by President Bartsch at 8 P.M., with sixty-five persons present.

Dr. Charles Monroe Mansfield, of the Bureau of Animal Industry, on recommendation of the council, was elected to active membership.

Under the heading of Brief Notes, General Wilcox made observations and inquiries concerning the color of the eyes of certain turtles. His remarks were discussed by W. P. Hay. Dr. Howard described the successful campaign carried on against mosquitoes in New Jersey.

Under the heading Exhibition of Specimens, Wm. Palmer exhibited the tip of the tongue of a sulphurbottom whale and considered the probable use of its peculiar shape. Messrs. Bartsch, Hay and Lyon took part in the discussion.

The regular program consisted of an illustrated lecture by H. C. Oberholser, entitled, "A Naturalist in Nevada." Mr. Oberholser gave an account of a biological survey of parts of Nevada made by himself and others some years ago. He described the geologic, geographic and climatic characters of the route traversed by his party. He mentioned in particular the plants, the mammals, birds and reptiles observed and collected by the expedition; and pointed out how they were influenced in kind and numbers by the unusual geographic and climatic conditions found in Nevada. He showed many excellent views of the country and of the animals and plants encountered.

Mr. Oberholser's paper was discussed by Messrs. Hay, Bartsch, Bailey, Lyon, Goldman, Wetmore and Wm. Palmer.

M. W. Lyon, Jr.,
Recording Secretary

THE ANTHROPOLOGICAL SOCIETY OF WASHINGTON

At a special meeting of the society, held November 3, 1914, at the public library, Dr. J. Walter Fewkes read a paper on "Vanished Races of the Caribbean." The aborigines who, in pre-Columbian times, inhabited the West Indies, represent a vanished race, for with the exception of very incomplete historical accounts and a few highly modified living survivors, archeological remains only are left from which to determine their culture. The Antillean culture belonged to the stone age, and while it had attained a considerable development, it was quite unlike that of any other area in the New World. These islands were peopled from the neighboring continent, but the peculiar types of stone objects which occur on the islands indicate that the culture they represent originated where it was found. This culture was of two types, one in the Greater Antilles and the other in the so-called Carib Islands. These differ mainly in the forms of stone implements, pottery and other artifacts. For instance, 90 per cent. of the stone implements of the Greater Antilles have the form of celts, while the majority of implements from the Lesser Antilles are axes. This difference in the culture was noticed by Columbus and the early chroniclers. The inhabitants of the Lesser Antilles were called Caribs, the others Arawaks. The Caribs were preceded by an agricultural people whom they conquered in pre-Columbian times. All the islands from Cuba to Trinidad once had a highly developed population, which remained until later times only in the Greater Antilles. It is probable that the aborigines of the Lesser Antilles came from South America, but those of the Greater Antilles from Central America.

At a meeting of the society, held November 17, 1914, in the public library, Rev. Dr. John Lee Maddox, chaplain in the United States Army, read a paper on "The Spirit Theory in Early Medicine." The primitive theory is that disease and death are abnormal, the work of malevolent spirits or of witchcraft. Many modern remedies and practises are the direct descendents of old-time methods and drugs intended to cure the patient by driving out an evil spirit through fear or disgust. Bitter medicines originated in revolting doses intended to disgust the demon. Massage originated in the beatings and poundings through which the evil spirit was to be frightened out of the patient. Bleeding, cupping and trephining were originally intended to facilitate its exit. Through long centuries, even with an incorrect theory, it was learned that certain drugs and remedies had a beneficial effect upon certain diseases. Thus the correct practise developed long before the correct theory. As examples of standard remedies derived from Indian doctors, he instanced ipecac and quinine. In the discussion Dr. Fewkes drew illustrations from the Hopi Indians, Mr. Mooney from the Cherokee, and Dr. Moore from the St. Lawrence Island Eskimo. Dr. E. L. Morgan and others also spoke.

Daniel Folkmar,
Secretary